

# Part I—Administrative

## CHAPTER 1 SCOPE AND ADMINISTRATION

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### User note:

**About this chapter:** Chapter 1 establishes the limits of applicability of the code and describes how the code is to be applied and enforced. Chapter 1 is in two parts: Part 1—General Provisions (Sections 101–102) and Part 2—Administrative Provisions (Sections 103–114). Section 102 identifies which buildings and structures come under its purview and references other I-Codes as applicable.

This code is intended to be adopted as a legally enforceable document, and it cannot be effective without adequate provisions for its administration and enforcement. The provisions of Chapter 1 establish the authority and duties of the code official appointed by the authority having jurisdiction and also establish the rights and privileges of the design professional, contractor and property owner.

**Code development reminder:** Code change proposals to this chapter will be considered by the Administrative Code Development Committee during the 2022 (Group B) Code Development Cycle.

Portions of this chapter were extensively reorganized for the 2021 edition. For clarity, the relocation marginal markings have not been included. For complete information, see the relocations table in the preface information of this code.

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## PART 1—GENERAL PROVISIONS

### SECTION 101 SCOPE AND GENERAL REQUIREMENTS

[S][A] **101.1 Title.** These regulations shall be known as the Seattle Fire Code, ~~((of [NAME OF JURISDICTION]))~~ hereinafter referred to as “this code.”

Throughout this code, where references are made to the International Building Code, International Residential Code, International Mechanical Code, International Fuel Gas Code, and the International Existing Building Code, those references mean those codes with Seattle amendments. Where NFPA 70 is referenced, it means the Seattle Electrical Code, which is the National Electrical Code with Seattle amendments.

[S][A] **101.2 Scope.** This code establishes regulations affecting or relating to structures, vehicles, vessels, processes, premises and safeguards regarding all of the following:

1. The hazard of fire and explosion arising from the storage, handling or use of structures, materials or devices.
2. Conditions hazardous to life, property or public welfare in the occupancy of structures, vehicles, vessels, or premises.
3. Fire hazards in the structure, vehicles, vessels, or on the premises from occupancy or operation.
4. Matters related to the construction, extension, repair, *alteration* or removal of fire protection systems.
5. Conditions affecting the safety of fire fighters and emergency responders during emergency operations.

[A] **101.2.1 Appendices.** Provisions in the appendices ~~((shall))~~ do not apply unless specifically adopted.

[S][A] **101.3 Purpose.** The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures, ~~((and))~~ premises, vehicles, and vessels and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

This code is enacted as an exercise of the police power of The City of Seattle to protect the public peace, health, safety, and welfare, and its provisions shall be liberally construed to accomplish these purposes. The express purpose of this code is to promote the health, safety, and welfare of the general public, and not to create or otherwise establish or designate any particular class or group of persons who will or should be especially protected or benefitted by the terms of this code or ordinance.

The specific intent of this code is to place the obligation of complying with its requirements upon the owners, owner’s authorized agents, or occupiers of premises, buildings, vehicles, vessels, and structures within its scope. No provision or term used in this code is intended to impose any duty whatsoever upon the City, or any of its officers or employees, for whom the implementation or enforcement of this code is discretionary, not mandatory.

[A] **101.4 Severability.** If a section, subsection, sentence, clause or phrase of this code is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this code.

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[A] **101.5 Validity.** In the event any part or provision of this code is held to be illegal or void, this shall not have the effect of making void or illegal any of the other parts or provisions hereof, which are determined to be legal; and it shall be presumed that this code would have been adopted without such illegal or invalid parts or provisions.

[S] **101.6 Point of information or code interpretation.** Text marked “Point of Information” or “Code Interpretation” in this code is for guidance only and does not have the force of law.

## SECTION 102 APPLICABILITY

[S][A] **102.1 Construction and design provisions.** The construction and design provisions of this code (~~shall~~) apply to:

1. Structures, facilities and conditions arising after the adoption of this code.
2. Existing structures, facilities and conditions not legally in existence at the time of adoption of this code.
3. Existing structures, facilities and conditions where required in Chapter 11.
4. Existing structures, facilities and conditions that, in the opinion of the *fire code official*, constitute an (~~distinct~~) imminent hazard to life or property.

[A] **102.2 Administrative, operational and maintenance provisions.** The administrative, operational and maintenance provisions of this code shall apply to:

1. Conditions and operations arising after the adoption of this code.
2. Existing conditions and operations.

[A] **102.3 Change of use or occupancy.** A change of occupancy shall not be made unless the use or occupancy is made to comply with the requirements of this code and the *International Existing Building Code*.

**Exception:** Where *approved* by the *fire code official*, a change of occupancy shall be permitted without complying with the requirements of this code and the *International Existing Building Code*, provided that the new or proposed use or occupancy is less hazardous, based on life and fire risk, than the existing use or occupancy.

[A] **102.4 Application of building code.** The design and construction of new structures shall comply with the *International Building Code*, and any *alterations*, additions, changes in use or changes in structures required by this code, which are within the scope of the *International Building Code*, shall be made in accordance therewith.

[S][A] **102.5 Application of residential code.** (~~Where~~) If structures are designed and constructed in accordance with the *International Residential Code*, the provisions of this code (~~shall~~) apply as follows:

1. Construction and design provisions of this code pertaining to the exterior of the structure (~~shall~~) apply including, but not limited to, premises identification, fire apparatus access and water supplies. (~~Where~~) If interior or exterior systems or devices are installed, construction permits required by Section 105.6 (~~shall~~) apply.
2. Administrative, operational and maintenance provisions of this code (~~shall~~) apply.

[A] **102.6 Historic buildings.** The provisions of this code relating to the construction, *alteration*, repair, enlargement, restoration, relocation or moving of buildings or structures shall not be mandatory for existing buildings or structures identified and classified by the state or local jurisdiction as historic buildings where such buildings or structures do not constitute a distinct hazard to life or property. Fire protection in designated historic buildings shall be provided with an *approved* fire protection plan as required in Section 1103.1.1.

[S][A] **102.7 Referenced codes and standards.** The codes and standards referenced in this code (~~shall be~~) are those that are listed in Chapter 80, including amendments adopted by the City Council by ordinance, and such codes and standards (~~shall be~~) are considered to be part of the requirements of this code to the prescribed extent of each such reference and as further regulated by Sections 102.7.1 and 102.7.2.

[A] **102.7.1 Conflicts.** Where conflicts occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

[A] **102.7.2 Provisions in referenced codes and standards.** Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of this code, the provisions of this code, as applicable, shall take precedence over the provisions in the referenced code or standard.

[A] **102.8 Subjects not regulated by this code.** Where applicable standards or requirements are not set forth in this code, or are contained within other laws, codes, regulations, ordinances or bylaws adopted by the jurisdiction, compliance with applicable standards of the National Fire Protection Association or other nationally recognized fire safety standards, as *approved*, shall be deemed as prima facie evidence of compliance with the intent of this code. Nothing herein shall derogate from the authority of the *fire code official* to determine compliance with codes or standards for those activities or installations within the *fire code official's* jurisdiction or responsibility.

[A] **102.9 Matters not provided for.** Requirements that are essential for the public safety of an existing or proposed activity, building or structure, or for the safety of the occupants thereof, that are not specifically provided for by this code, shall be determined by the *fire code official*.

[A] **102.10 Conflicting provisions.** Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable. Where, in a specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

[A] **102.11 Other laws.** The provisions of this code shall not be deemed to nullify any provisions of local, state or federal law.

[A] **102.12 Application of references.** References to chapter or section numbers, or to provisions not specifically identified by number, shall be construed to refer to such chapter, section or provision of this code.

## PART 2—ADMINISTRATION AND ENFORCEMENT

### SECTION 103 CODE COMPLIANCE AGENCY

[A] **103.1 Creation of agency.** The (~~(INSERT NAME OF DEPARTMENT)~~) Fire Prevention Division is hereby created and the official in charge thereof shall be known as the *fire code official*. The function of the agency shall be the implementation, administration and enforcement of the provisions of this code.

[S][A] **103.2 Appointment.** (~~The~~) A *fire code official*, other than the fire chief, shall be appointed by the fire chief, (~~(appointing authority of the jurisdiction.)~~)

[A] **103.3 Deputies.** In accordance with the prescribed procedures of this jurisdiction and with the concurrence of the appointing authority, the *fire code official* shall have the authority to appoint a deputy *fire code official*, other related technical officers, inspectors and other employees. Such employees shall have powers as delegated by the *fire code official*.

### SECTION 104 DUTIES AND POWERS OF THE FIRE CODE OFFICIAL

[S][A] **104.1 General.** The *fire code official* is hereby authorized to enforce the provisions of this code. The *fire code official* shall have the authority to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to implement this code and clarify the application of its provisions. Such interpretations, policies, procedures, rules and regulations shall be in compliance with the intent and purpose of this code. Such policies, procedures, rules and regulations shall not have the effect of waiving requirements specifically provided for in this code.

[A] **104.2 Applications and permits.** The *fire code official* is authorized to receive applications, review *construction documents* and issue permits for construction regulated by this code, issue permits for operations regulated by this code, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

[A] **104.3 Right of entry.** Where it is necessary to make an inspection to enforce the provisions of this code, or where the *fire code official* has reasonable cause to believe that there exists in a building or on any premises any conditions or violations of this code that make the building or premises unsafe, dangerous or hazardous, the *fire code official* shall have the authority to enter the building or premises at all reasonable times to inspect or to perform the duties imposed on the *fire code official* by this code. If such building or premises is occupied, the *fire code official* shall present credentials to the occupant and request entry. If such building or premises is unoccupied, the *fire code official* shall first make a reasonable effort to locate the *owner*, the *owner's* authorized agent or other person having charge or control of the building or premises and request entry. If entry is refused, the *fire code official* has recourse to every remedy provided by law to secure entry.

[S] **104.3.1 Owner consent.** With the consent of the *owner*, the *owner's* authorized agent or occupier of a building, premises, vehicle, or vessel, or pursuant to a lawfully issued warrant, the *fire code official* may enter any building, premises, vehicle, or vessel at any reasonable time to inspect or to perform the duties authorized by this code.

[S][A] (~~(104.3.1)~~) **104.3.2 Warrant.** (~~Where the *fire code official* has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an~~) An *owner*, the *owner's* authorized agent or occupant or person having charge, care or control of the building, vehicle, vessel or premises shall not fail or neglect, after (~~(proper request is made as herein provided)~~) a warrant is presented to the person, to permit entry therein by the *fire code official* for the purpose of inspection and examination pursuant to this code.

[A] **104.4 Identification.** The *fire code official* shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[S][A] **104.5 Notices and orders.** The *fire code official* is authorized to issue such notices or orders as are required to affect compliance with this code in accordance with Sections (~~(112.1 and 112.2)~~) 112, 113 and 114.

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[S][A] **104.6 Official records.** The *fire code official* shall keep official records as required by Sections 104.6.1 through 104.6.4. Such official records shall be retained for not less than 5 years or for as long as the structure or activity to which such records relate remains in existence, unless otherwise provided by other laws or regulations.

[A] **104.6.1 Approvals.** A record of approvals shall be maintained by the *fire code official* and shall be available for public inspection during business hours in accordance with applicable laws.

[S][A] **104.6.2 Inspections.** The *fire code official* shall keep a record of (~~each inspection made, including notices~~) inspections, notices, violations, correction letters, and orders issued, showing the findings and disposition of each.

**104.6.3 Fire records.** The fire department shall keep a record of fires occurring within its jurisdiction and of facts concerning the same, including statistics as to the extent of such fires and the damage caused thereby, together with other information as required by the *fire code official*.

[S][A] **104.6.4 Administrative.** Application for modification, alternative methods or materials and the final decision of the *fire code official* on any such application shall be in writing and shall be officially recorded in the permanent records of the *fire code official*.

[S][A] **104.7 Liability.** (~~The *fire code official*, member of the board of appeals, officer or employee charged with the enforcement of this code, while acting for the jurisdiction, in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered civilly or criminally liable personally, and is hereby relieved from all personal liability for any damage accruing to persons or property as a result of an act or by reason of an act or omission in the discharge of official duties.~~) Nothing contained in this code is intended to, nor shall be construed to, create or form the basis for any liability on the part of the City, its officers, employees or agents, for any injury or damage resulting from the failure of the owner or occupier of premises, buildings, structures, vehicles or vessels, to comply with this code, or for any injury or damage caused by any act or omission on the part of the City by its officers, employees or agents in the course of implementing or enforcing this code.

Any lawsuit brought against the City, or its officers, employees, or agents because of acts or omissions in the implementation or enforcement of this code, or other pertinent laws, ordinances, or regulations implemented through the enforcement of this code or enforced by the *fire code official*, shall, as provided by Seattle Municipal Code Chapter 4.64, be defended by the City, and any resulting judgment or settlement shall be assumed or paid by the City as provided by Chapter 4.64 and other relevant sections of the Seattle Municipal Code.

Limited public funds are available for the implementation and enforcement of this code. The issuance of permits, reviews of permit applications, and inspections conducted pursuant to this code are spot checks designed to encourage compliance, and are not representations, guarantees, or assurances that permits, or work undertaken pursuant to issuance of permits, comply with any applicable codes.

~~(**104.7.1 Legal defense.** Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by the legal representatives of the jurisdiction until the final termination of the proceedings. The *fire code official* or any subordinate shall not be liable for costs in an action, suit or proceeding that is instituted in pursuance of the provisions of this code; and any officer of the department of fire prevention, acting in good faith and without malice, shall be free from liability for acts performed under any of its provisions or by reason of any act or omission in the performance of official duties in connection therewith.)~~)

[A] **104.8 Approved materials and equipment.** Materials, equipment and devices *approved* by the *fire code official* shall be constructed and installed in accordance with such approval.

[A] **104.8.1 Material and equipment reuse.** Materials, equipment and devices shall not be reused or reinstalled unless such elements have been reconditioned, tested and placed in good and proper working condition and *approved*.

[A] **104.8.2 Technical assistance.** To determine the acceptability of technologies, processes, products, facilities, materials and uses attending the design, operation or use of a building or premises subject to inspection by the *fire code official*, the *fire code official* is authorized to require the *owner* or *owner's* authorized agent to provide, without charge to the jurisdiction, a technical opinion and report. The opinion and report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the *fire code official* and shall analyze the fire safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to recommend necessary changes. The *fire code official* is authorized to require design submittals to be prepared by, and bear the stamp of, a *registered design professional*.

[A] **104.9 Modifications.** Where there are practical difficulties involved in carrying out the provisions of this code, the *fire code official* shall have the authority to grant modifications for individual cases, provided that the *fire code official* shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the department of fire prevention.

[A] **104.10 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *fire code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, *fire resistance*, durability and safety. Where the alternative material, design or method of construction is not *approved*, the *fire code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

[A] **104.10.1 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

[A] **104.10.2 Tests.** Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *fire code official* shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *fire code official* shall approve the testing procedures. Tests shall be performed by an *approved* agency. Reports of such tests shall be retained by the *fire code official* for the period required for retention of public records.

[S] **104.11 Fire investigations.** The *fire code official* ((§) or the fire department ((~~or other responsible authority~~)) shall have the authority to investigate the cause, origin and circumstances of any fire, explosion or other hazardous condition. Information that could be related to trade secrets or processes shall not be made part of the public record, except as directed by a court of law.

[S] 104.11.1 Authority of Fire Department fire investigators to exercise powers of police officers. Members of the Fire Department Fire Investigation Unit (FIU) that have been granted Arson Investigator/Special Police Officer (SPO) commissions by the Chief of the Seattle Police Department in accordance with Seattle Municipal Code Chapter 3.28 shall have the powers described in the ordinance and other powers described in this code.

Fire Investigation Unit (FIU) fire investigators are authorized to take immediate charge of all physical evidence relating to the cause of the fire if it appears that such fire is of incendiary or undetermined origin.

~~((104.11.1))~~ **104.11.2 Assistance from other agencies.** Police and other enforcement agencies shall have authority to render necessary assistance in the investigation of fires when requested to do so.

**104.12 Authority at fires and other emergencies.** The *fire chief* or officer of the fire department in charge at the scene of a fire or other emergency involving the protection of life or property, or any part thereof, shall have the authority to direct such operation as necessary to extinguish or control any fire, perform any rescue operation, investigate the existence of suspected or reported fires, gas leaks or other hazardous conditions or situations, or take any other action necessary in the reasonable performance of duty. In the exercise of such power, the *fire chief* is authorized to prohibit any person, vehicle, vessel or thing from approaching the scene, and is authorized to remove, or cause to be removed or kept away from the scene, any vehicle, vessel or thing that could impede or interfere with the operations of the fire department and, in the judgment of the *fire chief*, any person not actually and usefully employed in the extinguishing of such fire or in the preservation of property in the vicinity thereof.

**104.12.1 Barricades.** The *fire chief* or officer of the fire department in charge at the scene of an emergency is authorized to place ropes, guards, barricades or other obstructions across any street, alley, place or private property in the vicinity of such operation so as to prevent accidents or interference with the lawful efforts of the fire department to manage and control the situation and to handle fire apparatus.

[S] **104.12.2 Obstructing operations.** Persons shall not obstruct the operations of the fire department in connection with extinguishment or control or investigation of any fire, or actions relative to other emergencies, or disobey any lawful command of the *fire chief* or officer of the fire department in charge of the emergency, or any part thereof, or any lawful order of a police officer assisting the fire department.

**104.12.3 Systems and devices.** Persons shall not render a system or device inoperative during an emergency unless by direction of the *fire chief* or fire department official in charge of the incident.

[S] 104.13 Vehicle impoundment and removal. The *fire code official* may order the owner or operator to remove from a street or premises, or request that the Seattle Police Department impound, a vehicle under the following conditions:

1. The vehicle poses an immediate hazard to public safety; or
2. The vehicle is transporting hazardous materials, and is left unattended on a residential street or within 500 feet (152 400 mm) of any building containing a Group A, R, E, or I occupancy, including, but not limited to, any dwelling apartment, hotel, day care, school, hospital, or health care facility; or

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3. The vehicle contains or is carrying hazardous materials, or flammable or combustible liquids or gases, and is left unattended while transferring such materials, liquids, or gases by means of hose line.

**[S] 104.14 Prohibited uses, sales devices.** The fire code official may prohibit the use, display, or sale of any device, material, or object that is designed to be used in such a manner as to violate any provisions of this code, or if the use or sale of such constitutes a distinct hazard to life or property. Any materials shown by nationally recognized fire test to have a life hazard greater than that indicated by the manufacturer's literature and controlled by building code interior finish regulations or fire code decorative material regulations are either prohibited or shall be installed or used with such additional fire safety features as are necessary to substantially reduce the life hazard.

**[S] 104.15 Standby fire personnel and fire watch personnel.** The fire code official has the authority to require, at no cost to the jurisdiction, standby fire personnel and/or fire watch personnel if in the opinion of the fire code official potentially hazardous conditions or reductions in a life safety feature exist. The owner, agent, or lessee shall provide one or more qualified persons, as required and approved, to be on duty. Such standby fire personnel or fire watch personnel shall be subject to the fire code official's orders at all times and remain on duty during the times such places are open to the public, when such activity is being conducted, or as required by the fire code official. Fire watch personnel are not employees or agents of the City.

## [S] SECTION 105 PERMITS AND CERTIFICATES

**[S][A] 105.1 General.** Permits shall be in accordance with Sections 105.1.1 through ((105.6.24)) 105.6.25. Certificates issued by the fire code official are revocable in accordance with the provisions of Section 105.5.

**[S][A] 105.1.1 Permits required.** A property owner or owner's authorized agent who intends to conduct an operation or business, or install or modify systems and equipment that are regulated by this code, or to cause any such work to be performed, shall first make application to the fire code official and obtain the required permit. Permit fees, if any, may be required to be paid prior to issuance of the permit. Failure to pay the required permit fee may result in cancellation of the permit.

**[S] 105.1.2 Types of permits.** There shall be two types of permits as follows:

1. Operational permit. An operational permit allows the applicant to conduct an operation or a business for which a permit is required by Section 105.5 for either:
  - 1.1. A prescribed period.
  - 1.2. Until renewed or revoked.
2. ~~((Construction))~~ Installation permit. ~~An ((construction))~~ installation permit allows the applicant to install or modify systems and equipment for which a permit is required by Section 105.6.

**105.1.3 Multiple permits for the same location.** Where more than one permit is required for the same location, the fire code official is authorized to consolidate such permits into a single permit provided that each provision is listed in the permit.

**[S][A] 105.1.4 Emergency repairs.** ~~((Where equipment replacement and repairs must be performed in an emergency situation, the permit application shall be submitted within the next working business day to the fire code official.))~~ If a permit is required by this code before equipment may be replaced or repaired but cannot reasonably be obtained beforehand due to an emergency, the permit application shall be submitted to the fire code official the next business day following cessation of the emergency.

**[S][A] 105.1.5 Repairs.** Application or notice to the fire code official is not required for ordinary repairs to structures, equipment or systems. ~~((Such))~~ Ordinary repairs ~~((shall))~~ do not include the cutting away of any wall, partition or portion thereof, the removal or change of any required means of egress, or rearrangement of parts of a structure affecting ~~((the))~~ egress requirements ~~((; nor shall))~~ or any repairs ~~((include))~~ including the addition to, alteration of, replacement or relocation of any standpipe, fire protection water supply, automatic sprinkler system, fire alarm system or other work affecting fire protection or life safety.

**[S][A] 105.1.6 Annual permit.** Instead of an individual construction permit for each alteration to an already approved system or equipment installation, the fire code official ~~((is authorized to))~~ may issue an annual permit on application therefor to any person, firm or corporation regularly employing one or more qualified tradespersons in the building, structure or on the premises owned or operated by the applicant for the permit.

**[S][A] 105.1.6.1 Annual permit records.** The person to whom an annual permit is issued shall keep a detailed record of alterations made under such annual permit. The fire code official shall have access to such records at all times or such records shall be filed with the fire code official ~~((as designated))~~ in accordance with applicable laws.

[A] **105.2 Application.** Application for a permit required by this code shall be made to the *fire code official* in such form and detail as prescribed by the *fire code official*. Applications for permits shall be accompanied by such plans as prescribed by the *fire code official*.

[S][A] **105.2.1 Refusal to issue permit.** If the application for a permit describes ~~((a-use))~~ an activity that does not conform to the requirements of this code and other pertinent laws and ordinances, the *fire code official* ~~((shall))~~ may not issue a permit, ~~((but shall))~~ and may return the application to the applicant with the refusal to issue such permit. Such refusal shall, where requested, be in writing and shall contain the reasons for refusal.

[A] **105.2.2 Inspection authorized.** Before a new operational permit is *approved*, the *fire code official* is authorized to inspect the receptacles, vehicles, buildings, devices, premises, storage spaces or areas to be used to determine compliance with this code or any operational constraints required.

[A] **105.2.3 Time limitation of application.** An application for a permit for any proposed work or operation shall be deemed to have been abandoned 180 days after the date of filing, unless such application has been diligently prosecuted or a permit shall have been issued; except that the *fire code official* is authorized to grant one or more extensions of time for additional periods not exceeding 90 days each. The extension shall be requested in writing and justifiable cause demonstrated.

[S][A] **105.2.4 Action on application.** The *fire code official* shall examine or cause to be examined applications for permits and amendments thereto within a reasonable time after filing. If the application or the *construction documents* do not conform to the requirements of pertinent laws, the *fire code official* ~~((shall))~~ may reject such application in writing, stating the reasons therefor. If the *fire code official* is satisfied that the proposed work or operation conforms to the requirements of this code and laws and ordinances applicable thereto, the *fire code official* shall issue a permit ~~((therefor))~~ as soon as practicable.

[S][A] **105.3 Conditions of a permit.** The *fire code official* may condition any permit, increasing or decreasing the scope of permitted activity, and/or specifying fire safety provisions in addition to those established by this code, if the *fire code official* deems such conditions necessary to provide reasonable public safety. A permit shall constitute permission to maintain, store or handle materials; or to conduct processes that produce conditions hazardous to life or property; or to install equipment utilized in connection with such activities; or to install or modify any *fire protection system* or equipment or any other construction, equipment installation or modification in accordance with the provisions of this code where a permit is required by Section 105.5 or 105.6. Such permission shall not be construed as authority to violate, cancel or set aside any of the provisions of this code or other applicable regulations or laws of the jurisdiction.

[A] **105.3.1 Expiration.** An operational permit shall remain in effect until reissued, renewed or revoked, or for such a period of time as specified in the permit. Construction permits shall automatically become invalid unless the work authorized by such permit is commenced within 180 days after its issuance, or if the work authorized by such permit is suspended or abandoned for a period of 180 days after the time the work is commenced. Before such work recommences, a new permit shall be first obtained and the fee to recommence work, if any, shall be one-half the amount required for a new permit for such work, provided that changes have not been made and will not be made in the original *construction documents* for such work, and provided further that such suspension or abandonment has not exceeded one year. Permits are not transferable and any change in occupancy, operation, tenancy or ownership shall require that a new permit be issued.

[A] **105.3.2 Extensions.** A permittee holding an unexpired permit shall have the right to apply for an extension of the time within which the permittee will commence work under that permit where work is unable to be commenced within the time required by this section for good and satisfactory reasons. The *fire code official* is authorized to grant, in writing, one or more extensions of the time period of a permit for periods of not more than 180 days each. Such extensions shall be requested by the permit holder in writing and justifiable cause demonstrated.

[S][A] **105.3.3 ~~((Occupancy))~~ Operations prohibited before approval.** ~~((The building or structure shall not be occupied))~~ Activities that require an operational permit or installations that require construction permits shall not commence or be used prior to the *fire code official* issuing a permit and conducting associated inspections indicating the applicable provisions of this code have been met.

#### **105.3.4 Point of Information**

Approval to occupy a building or structure is granted by the Seattle Department of Construction and Inspections through issuance of a certificate of occupancy or temporary certificate of occupancy. A Fire Department recommendation to issue an occupancy certificate is conditioned upon applicable provisions of this code being met.

[S][A] **105.3.4 ~~((Conditional permits))~~ Temporary certificate of occupancy.** ~~((Where permits are required and upon the request of a permit applicant, the))~~ The *fire code official* is authorized to ~~((issue a conditional permit))~~ recommend to the *building code official* that a temporary certificate of occupancy be issued to occupy the premises or portion thereof before the entire work or operations on the premises ~~((is))~~ are completed, provided that such portion or portions will be occupied safely prior to full completion or installation of equipment and operations without endangering life or public welfare. The

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*fire code official* shall notify the ~~((permit applicant))~~ *building code official* in writing of any limitations or restrictions necessary to keep the ~~((permit))~~ occupied area safe. The holder of a ~~((conditional permit))~~ temporary certificate of occupancy shall proceed only to the point for which approval has been given, at the permit holder's own risk and without assurance that approval for the occupancy or the utilization of the entire premises, equipment or operations will be granted.

**[A] 105.3.5 Posting the permit.** Issued permits shall be kept on the premises designated therein at all times and shall be readily available for inspection by the *fire code official*.

**[A] 105.3.6 Compliance with code.** The issuance or granting of a permit shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or of any other ordinance of the jurisdiction. Permits presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be valid. The issuance of a permit based on *construction documents* and other data shall not prevent the *fire code official* from requiring the correction of errors in the *construction documents* and other data. Any addition to or alteration of *approved construction documents* shall be *approved* in advance by the *fire code official*, as evidenced by the issuance of a new or amended permit.

**[A] 105.3.7 Information on the permit.** The *fire code official* shall issue all permits required by this code on an *approved* form furnished for that purpose. The permit shall contain a general description of the operation or occupancy and its location and any other information required by the *fire code official*. Issued permits shall bear the signature of the *fire code official* or other *approved* legal authorization.

**[A] 105.3.8 Validity of permit.** The issuance or granting of a permit shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or of any other ordinances of the jurisdiction. Permits presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be valid. The issuance of a permit based on *construction documents*, operational documents and other data shall not prevent the *fire code official* from requiring correction of errors in the documents or other data.

**[S] 105.3.9 Liability insurance.** If liability insurance is required by any section of this code as a permit condition or for a license, the applicant shall maintain continuously on file with the *fire code official* for the entire period of the licensed or permitted activity, evidence of "Commercial General Liability" (CGL) insurance coverage with a minimum limit of liability of \$2,000,000 per occurrence and \$2,000,000 general aggregate and \$2,000,000 products-completed operations aggregate. Coverage shall not be subject to a deductible. Such evidence of insurance coverage shall be provided on an Acord Certificate of Liability Insurance or equivalent ("Certificate") issued to "Seattle Fire Department, 301 2nd Ave S, Seattle, WA 98104." This policy shall include an additional insured endorsement in the name of "The City of Seattle" per CG2026 or equivalent. Permittee's insurance will be primary and non-contributory. Copies of these endorsements must be attached to the Certificate. The *fire code official* may increase or decrease the above-stated minimum limits of liability as the *fire code official* deems appropriate to reasonably insure The City of Seattle under the circumstances.

The policy shall be:

1. Issued by an insurance company or companies with a Best rating of A-VIII or better and authorized to do business as an insurer in Washington State pursuant to the provisions of RCW Title 48;
2. Issued for the purpose of complying with the conditions and requirements of Section 105 of this code; and
3. Subject to approval as to sufficiency and form by the City's Risk Management Division at the request of the *fire code official*.

With the policy, the applicant shall also obtain a written obligation on the part of the insurance company to provide written notice to the *fire code official* of cancellation or non-renewal of the policy as required by RCW 48.18.290. To the extent RCW 48.18.290 does not apply, such notice shall be at least 30 days before the effective date of the cancellation or non-renewal, or at least 10 days if the cancellation or non-renewal is for nonpayment of one or more premiums.

**[S][A] 105.4 Revocation of permits and certificates.** Revocation of permits and certificates shall be in accordance with this section. ((The *fire code official* is authorized to revoke a permit issued under the provisions of this code where it is found by inspection or otherwise that there has been a false statement or misrepresentation as to the material facts in the application or *construction documents* on which the permit or approval was based including, but not limited to, any one of the following:

1. The permit is used for a location or establishment other than that for which it was issued.
2. The permit is used for a condition or activity other than that listed in the permit.
3. Conditions and limitations set forth in the permit have been violated.
4. There have been any false statements or misrepresentations as to the material fact in the application for permit or plans submitted or a condition of the permit.
5. The permit is used by a different person or firm than the name for which it was issued.
6. The permittee failed, refused or neglected to comply with orders or notices duly served in accordance with the provisions of this code within the time provided therein.



7. ~~The permit was issued in error or in violation of an ordinance, regulation or this code.))~~

**[S] 105.4.1 Nonemergency revocations, suspensions and denials of renewals.** In accordance with applicable law, the fire code official may revoke or suspend a permit or certificate or deny a request to renew any permit or certificate upon evidence submitted to the fire code official that conditions or circumstances have changed so that continued use of the permit or certificate would be unsafe or would violate this code. Such conditions or circumstances include, but are not limited to:

1. The permit has been used by a person other than the person to whom the permit was issued;
2. The permit has been used for a location other than that for which it was issued;
3. Any of the conditions or limitations in the permit or the code have been violated;
4. The permittee failed, refused, or neglected to comply within the time provided with orders or notices duly served in accordance with the provisions of this code;
5. There has been a false statement or misrepresentation as to a material fact in the application or plans on which the permit or application was based; or
6. The permit was issued in error or in violation of any code, regulation or other law.

**[S] 105.4.1.1 Notification.** The permit or certificate holder shall be notified in writing no later than five business days prior to the revocation, suspension or denial of a request to renew such permit or certificate.

**[S] 105.4.1.2 Requesting a hearing.** The permit or certificate holder may request in writing a hearing before the fire code official for reconsideration of the decision to revoke, suspend or deny renewal. The request shall be filed with the fire code official by 5:00 p.m. of the fifth business day following service of the notice.

**[S] 105.4.1.3 Hearing.** The hearing, if one is requested, shall be held no later than five business days after receipt of the written request.

**[S] 105.4.1.4 Final decision.** The fire code official shall issue a final decision, in writing, sustaining, modifying, or withdrawing the initial decision to revoke, suspend or deny a request to renew the permit or certificate no later than the fifth business day following such hearing. Further appeals shall be in accordance with Section 111 of this code.

**[S] 105.4.2 Emergency revocations, suspensions, and denials of requests to renew.** The fire code official may revoke, suspend or deny a request to renew a permit or certificate in emergency situations, without providing prior notice to the permit or certificate holder, if an imminent fire, life-safety, or other hazard regulated by this code exists, and failure to take immediate action may cause imminent harm to humans, domestic animals, livestock, wildlife, or to the immediate or neighboring property, lands, or premises.

**[S] 105.4.2.1 Surrendering permits or certificates.** If such emergency is found to exist and if the fire code official revokes, suspends, or refuses to renew a permit or certificate, all certificates and permits shall be surrendered to the fire code official or the fire code official's authorized representative upon demand.

**[S] 105.4.2.2 Suspending activities.** The activities sanctioned by the suspended or revoked certificates or permits shall be suspended until the fire code official finds the emergency no longer exists and reinstates the permit or certificate.

**[S] 105.4.2.3 Requesting an appeal.** Persons whose permits or certificates have been revoked or suspended without notice may appeal the fire code official's action by filing a written notice of appeal to the fire code official by 5:00 p.m. of the fifth business day following such revocation, suspension or denial or a request to renew a permit or certificate.

**[S] 105.4.2.4 Hearing.** The hearing with the fire code official shall be no later than five business days from the receipt of such written appeal.

**[S] 105.4.2.5 Final decision.** The fire code official shall issue a final decision in writing, sustaining, modifying, or withdrawing the initial decision to revoke, suspend, or deny a request to renew the certificate or permit no later than the fifth business day following such hearing.

**[S] 105.4.2.6 Further appeals.** Further appeals shall be in accordance with Section 111 of this code.

**[S] 105.5 Required operational permits.** The fire code official is authorized to issue operational permits for the operations set forth in Sections 105.5.2 through ~~((405.5.52))~~ 105.5.58.

**105.5.1 Additive manufacturing.** An operational permit is required to conduct additive manufacturing operations regulated by Section 320.3.

**105.5.2 Aerosol products, aerosol cooking spray products and plastic aerosol 3 products.** An operational permit is required to manufacture, store or handle an aggregate quantity of Level 2 or Level 3 aerosol products, aerosol cooking spray products or plastic aerosol 3 products in excess of 500 pounds (227 kg) net weight.

**105.5.3 Amusement buildings.** An operational permit is required to operate a special amusement building.

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**105.5.4 Aviation facilities.** An operational permit is required to use a Group H or Group S occupancy for aircraft servicing or repair and aircraft fuel-servicing vehicles. Additional permits required by other sections of this code include, but are not limited to, hot work, hazardous materials and flammable or combustible finishes.

**[S] 105.5.5 Bonfires.** An operational permit is required to ignite a *bonfire*.

**((105.5.5)) 105.5.6 Carnivals and fairs.** An operational permit is required to conduct a carnival or fair.

**((105.5.6)) 105.5.7 Cellulose nitrate film.** An operational permit is required to store, handle or use cellulose nitrate film in a Group A occupancy.

**((105.5.7)) 105.5.8 Combustible dust-producing operations.** An operational permit is required to operate a grain elevator, flour starch mill, feed mill, or a plant pulverizing aluminum, coal, cocoa, magnesium, spices or sugar, or other operations producing *combustible dusts* as defined in Chapter 2.

**((105.5.8)) 105.5.9 Combustible fibers.** An operational permit is required for the storage and handling of *combustible fibers* in quantities greater than 100 cubic feet (2.8 m<sup>3</sup>).

**Exception:** A permit is not required for agricultural storage.

**[S] 105.5.10 Combustible storage.** An operational permit is required to store in any building or upon any premises class III or higher hazard commodities in excess of 2,500 cubic feet (70.8 m<sup>3</sup>) gross volume.

**[S] ((105.5.9)) 105.5.11 Compressed gases.** An operational permit is required for the storage, use or handling at *normal temperature and pressure* (NTP) of *compressed gases* in excess of the amounts listed in Table ((105.5.9)) 105.5.11.

**Exception:** Vehicles equipped for and using *compressed gas* as a fuel for propelling the vehicle.

**TABLE ((105.5.9)) 105.5.11  
PERMIT AMOUNTS FOR COMPRESSED GASES**

TYPE OF GAS	AMOUNT (cubic feet at NTP)
Carbon dioxide used in carbon dioxide enrichment systems	875 (100 lb)
Carbon dioxide used in insulated liquid carbon dioxide beverage dispensing applications	875 (100 lb)
Corrosive	200
Flammable (except cryogenic fluids and liquefied petroleum gases)	200
Highly toxic	Any Amount
Inert and simple asphyxiant	6,000
Oxidizing (including oxygen)	504
Pyrophoric	Any Amount
Toxic	Any Amount

For SI: 1 cubic foot = 0.02832 m<sup>3</sup>.

**[S] ((105.5.10)) 105.5.12 Covered and open mall buildings.** An operational permit is required for:

1. The placement of retail fixtures and displays, concession equipment, displays of highly combustible goods and similar items in the mall.
2. The display of liquid- or gas-fired equipment in the mall.
3. The use of open-flame or flame-producing equipment in the mall.
4. The use of covered mall buildings for assembly purposes.

**[S] ((105.5.11)) 105.5.13 Cryogenic fluids.** An operational permit is required to produce, store, transport on site, use, handle or dispense *cryogenic fluids* in excess of the amounts listed in Table ((105.5.11)) 105.5.13.

**Exception:** Permits are not required for vehicles equipped for and using *cryogenic fluids* as a fuel for propelling the vehicle or for refrigerating the lading.

**TABLE ((105.5.11)) 105.5.13  
PERMIT AMOUNTS FOR CRYOGENIC FLUIDS**

TYPE OF CRYOGENIC FLUID	INSIDE BUILDING (gallons)	OUTSIDE BUILDING (gallons)
Flammable	More than 1	60
Inert	60	500
Oxidizing (includes oxygen)	10	50
Physical or health hazard not indicated above	Any Amount	Any Amount

For SI: 1 gallon = 3.785 L.

[S] ~~((105.5.12))~~ **105.5.14 Cutting and welding.** An operational permit is required to conduct cutting or welding operations within the jurisdiction. See Section 105.5.27, *Hot work operations*.

~~((105.5.13))~~ **105.5.15 Dry cleaning.** An operational permit is required to engage in the business of dry cleaning or to change to a more hazardous cleaning solvent used in existing dry cleaning equipment.

~~((105.5.14))~~ **105.5.16 Energy storage systems.** An operational permit is required for stationary and mobile energy storage systems regulated by Section 1207.

~~((105.5.15))~~ **105.5.17 Exhibits and trade shows.** An operational permit is required to operate exhibits and trade shows.

[S] ~~((105.5.16))~~ **105.5.18 Explosives.** An operational permit is required for the ~~((manufacture,))~~ storage, handling, sale or use of any quantity of *explosives, explosive materials*, fireworks or pyrotechnic special effects within the scope of Chapter 56.

**Exception:** Storage in Group R-3 occupancies of smokeless propellant, black powder and small arms primers for personal use, not for resale and in accordance with Section 5606.

#### **105.5.18 Point of Information**

The manufacture of *explosives* is prohibited in Seattle.

~~((105.5.17))~~ **105.5.19 Fire hydrants and valves.** An operational permit is required to use or operate fire hydrants or valves intended for fire suppression purposes that are installed on water systems and provided with ready access from a fire apparatus access road that is open to or generally used by the public.

**Exception:** A permit is not required for authorized employees of the water company that supplies the system or the fire department to use or operate fire hydrants or valves.

[S] ~~((105.5.18))~~ **105.5.20 Flammable and combustible liquids.** An operational permit is required:

1. To use or operate a pipeline for the transportation within facilities of *flammable* or *combustible liquids*. This requirement shall not apply to the off-site transportation in pipelines regulated by the Department of Transportation (DOTn) nor does it apply to piping systems.
2. To store, handle or use Class I liquids in excess of 5 gallons (19 L) in a building or in excess of 10 gallons (37.9 L) outside of a building, except that a permit is not required for the following:
  - 2.1. The storage or use of Class I liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant or mobile heating plant, or storage of *approved* portable motor boat fuel containers of 6 gallons or less individual capacity and 12 gallons aggregate capacity, unless such storage, in the opinion of the *fire code official*, would cause an unsafe condition.
  - 2.2. The storage or use of paints, oils, varnishes or similar flammable mixtures where such liquids are stored for maintenance, painting or similar purposes for a period of not more than 30 days.
3. To store, handle or use Class II or Class IIIA liquids in excess of 25 gallons (95 L) in a building or in excess of 60 gallons (227 L) outside a building, except for fuel oil used in connection with oil-burning equipment.
4. To store, handle or use Class IIIB liquids in tanks or portable tanks for fueling motor vehicles at motor fuel-dispensing facilities or where connected to fuel-burning equipment.

**Exception:** Fuel oil and used motor oil used for space heating or water heating.

5. To remove Class I or II liquids from an underground storage tank used for fueling motor vehicles by any means other than the *approved*, stationary on-site pumps normally used for dispensing purposes.
6. To operate tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where *flammable* and *combustible liquids* are produced, processed, transported, stored, dispensed or used.
7. To place temporarily out of service (for more than 90 days) an underground, protected above-ground or above-ground *flammable* or *combustible liquid* tank.
8. To change the type of contents stored in a *flammable* or *combustible liquid* tank to a material that poses a greater hazard than that for which the tank was designed and constructed.
9. To manufacture, process, blend or refine *flammable* or *combustible liquids*.
10. To engage in the dispensing of liquid fuels into the fuel tanks of motor vehicles at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4 or to engage in on-demand mobile fueling operations in accordance with Section 5707.
11. To utilize a site for the dispensing of liquid fuels from tank vehicles into the fuel tanks of motor vehicles, marine craft and other special equipment at commercial, industrial, governmental or manufacturing establishments in

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accordance with Section 5706.5.4 or, where required by the *fire code official*, to utilize a site for on-demand mobile fueling operations in accordance with Section 5707.

12. To engage in the business of removing, decommissioning, or otherwise disposing of residential heating oil tanks.

~~((405.5.19))~~ **105.5.21 Floor finishing.** An operational permit is required for floor finishing or surfacing operations exceeding 350 square feet (33 m<sup>2</sup>) using Class I or Class II liquids.

~~((405.5.20))~~ **105.5.22 Fruit and crop ripening.** An operational permit is required to operate a fruit- or crop-ripening facility or conduct a fruit-ripening process using ethylene gas.

[S] ~~((405.5.21))~~ **105.5.23 Fumigation and insecticidal fogging.** An operational permit is required to operate a business of fumigation or insecticidal fogging, and to maintain a room, vault, freight container or chamber in which a toxic or flammable fumigant is used.

[S] ~~((405.5.22))~~ **105.5.24 Hazardous materials.** An operational permit is required to store, transport on site, dispense, use or handle hazardous materials in excess of the amounts listed in Table ~~((405.5.22))~~ 105.5.24.

**[S] TABLE ~~((405.5.22))~~ 105.5.24  
PERMIT AMOUNTS FOR HAZARDOUS MATERIALS**

TYPE OF MATERIAL	AMOUNT
Combustible liquids	See Section <del>((405.5.18))</del> <u>105.5.20</u>
Corrosive materials	
Gases	See Section <del>((405.5.9))</del> <u>105.5.11</u>
Liquids	55 gallons
Solids	1,000 pounds
Explosive materials	See Section <del>((405.5.16))</del> <u>105.5.18</u>
Flammable materials	
Gases	See Section <del>((405.5.9))</del> <u>105.5.11</u>
Liquids	See Section <del>((405.5.18))</del> <u>105.5.20</u>
Solids	100 pounds
Highly toxic materials	
Gases	See Section <del>((405.5.9))</del> <u>105.5.11</u>
Liquids	Any Amount
Solids	Any Amount
Organic peroxides	
Liquids	
Class I	Any Amount
Class II	Any Amount
Class III	1 gallon
Class IV	2 gallons
Class V	No Permit Required
Solids	
Class I	Any Amount
Class II	Any Amount
Class III	10 pounds
Class IV	20 pounds
Class V	No Permit Required
Oxidizing materials	
Gases	See Section <del>((405.5.9))</del> <u>105.5.11</u>
Liquids	
Class 4	Any Amount
Class 3	1 gallon <sup>a</sup>
Class 2	10 gallons
Class 1	55 gallons
Solids	
Class 4	Any Amount
Class 3	10 pounds <sup>b</sup>
Class 2	100 pounds
Class 1	500 pounds

**[S] TABLE ((405.5.22)) 105.5.24—continued  
PERMIT AMOUNTS FOR HAZARDOUS MATERIALS**

TYPE OF MATERIAL	AMOUNT
Pyrophoric materials Gases Liquids Solids	Any Amount Any Amount Any Amount
Toxic materials Gases Liquids Solids	See Section ((405.5.9)) <u>105.5.11</u> 10 gallons 100 pounds
Unstable (reactive) materials Liquids Class 4 Class 3 Class 2 Class 1 Solids Class 4 Class 3 Class 2 Class 1	Any Amount Any Amount 5 gallons 10 gallons Any Amount Any Amount 50 pounds 100 pounds
Water-reactive materials Liquids Class 3 Class 2 Class 1 Solids Class 3 Class 2 Class 1	Any Amount 5 gallons 55 gallons Any Amount 50 pounds 500 pounds

For SI: 1 gallon = 3.785 L, 1 pound = 0.454 kg.

- a. 22 gallons where Table 5003.1.1(1) Note k applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 22 gallons or less.
- b. 220 pounds where Table 5003.1.1(1) Note k applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 220 pounds or less.

**((405.5.23)) 105.5.25 HPM facilities.** An operational permit is required to store, handle or use hazardous production materials.

**((405.5.24)) 105.5.26 High-piled storage.** An operational permit is required to use a building or portion thereof with more than 500 square feet (46 m<sup>2</sup>), including aisles, of *high-piled combustible storage*.

**[S] ((405.5.25)) 105.5.27 Hot work operations.** An operational permit is required for hot work including, but not limited to:

1. Public exhibitions and demonstrations where hot work is conducted.
2. Use of portable hot work equipment, ~~((inside a structure.))~~

**Exception:** ~~((Work that is conducted under a construction permit.))~~ Approved self-contained torch assemblies or similar appliances using LP-gas in accordance with the following:

- a. LP-gas cylinders that comply with UL 147A, Standard for Nonrefillable (Disposable) Type Fuel Gas Cylinder Assemblies;
  - b. LP-gas cylinders that have a maximum water capacity of 2.7 lb (1.2 kg); and
  - c. The maximum aggregate water capacity of LP-gas cylinders in storage (e.g., not connected for use) and use does not exceed 2.7 lb (1.2 kg) per control area.
3. Fixed-site hot work equipment, such as welding booths.
  4. Hot work conducted within a wildfire risk area.
  5. Application of roof coverings with the use of an open-flame device.
  6. Where *approved*, the *fire code official* shall issue a permit to carry out a hot work program. This program allows *approved* personnel to regulate their facility's hot work operations. The *approved* personnel shall be trained in the

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fire safety aspects denoted in this chapter and shall be responsible for issuing permits requiring compliance with the requirements found in Chapter 35. These permits shall be issued only to their employees or hot work operations under their supervision.

7. Hot work on storage tanks, piping and associated systems containing or previously containing flammable or combustible liquids, or other hazardous materials that could present a fire or explosion hazard.

8. Hot work on vessels.

~~((405.5.26))~~ **105.5.28 Industrial ovens.** An operational permit is required for operation of industrial ovens regulated by Chapter 30.

**105.5.29 Laboratory.** An operational permit is required for the operation of a *laboratory*.

~~((405.5.27))~~ **105.5.30 Lumber yards and woodworking plants.** An operational permit is required for the storage or processing of lumber exceeding 100,000 board feet (8,333 ft<sup>3</sup>) (236 m<sup>3</sup>).

~~((405.5.28))~~ **105.5.31 Liquid- or gas-fueled vehicles or equipment in assembly buildings.** An operational permit is required to display, operate or demonstrate liquid- or gas-fueled vehicles or equipment in assembly buildings.

[S] ~~((405.5.29))~~ **105.5.32 LP-gas.** An operational permit is required for:

1. Storage and use of LP-gas.

### Exceptions:

1. A permit is not required for individual containers with a 500-gallon (1893 L) water capacity or less or multiple container systems having an aggregate quantity not exceeding 500 gallons (1893 L), serving occupancies in Group R-3.
  2. A permit is not required for LP-gas containers having a water capacity not exceeding 48 pounds [nominal 20 pounds (9 kg) LP-gas] connected to a LP-gas grill unless located at a public assembly or on a public way, or if used for commercial purposes.
  3. A permit is not required for storage of up to three spare forklift containers each having a maximum individual water capacity of 104 pounds (10 gallons LP-gas).
2. Operation of cargo tankers that transport LP-gas.

~~[W][S]~~ **105.5.33 Lithium batteries.** An operational permit is required for an accumulation of more than 15 cubic feet (0.42 m<sup>3</sup>) of lithium-ion and lithium metal batteries, where required by Section 322.1.

~~((405.5.30))~~ **105.5.34 Magnesium.** An operational permit is required to melt, cast, heat treat or grind more than 10 pounds (4.54 kg) of magnesium.

~~[S] ((405.5.31 Miscellaneous combustible storage. An operational permit is required to store in any building or on any premises in excess of 2,500 cubic feet (71 m<sup>3</sup>) gross volume of combustible empty packing cases, boxes, barrels or similar containers, combustible pallets, rubber tires, rubber, cork or similar combustible material.))~~

~~[S]~~ **105.5.35 Marine terminal and container freight stations.** An annual operational permit is required to handle or temporarily locate containers, tanks, or cylinders of hazardous materials at marine terminals and container freight stations located in Seattle.

~~[W][S]~~ ~~((405.5.32))~~ **105.5.36 Mobile food preparation vehicles.** A permit is required for mobile food preparation vehicles equipped with appliances that produce smoke or grease-laden vapors or utilize LP-gas systems or CNG systems.

~~((405.5.33))~~ **105.5.37 Motor fuel-dispensing facilities.** An operational permit is required for the operation of automotive, marine and fleet motor fuel-dispensing facilities.

~~[S] ((405.5.34))~~ **105.5.38 Open burning.** ~~((An operational permit is required for the kindling or maintaining of an open fire or a fire on any public street, alley, road, or other public or private ground. Instructions and stipulations of the permit shall be complied with.))~~ Open burning is prohibited in Seattle.

~~((Exception: Recreational fires.))~~

~~((405.5.35))~~ **105.5.39 Open flames and torches.** An operational permit is required to remove paint with a torch, or to use a torch or open-flame device in a wildfire risk area.

~~[S] ((405.5.36))~~ ~~105.5.40 ((Open flames and candles))~~ **Candles.** An operational permit is required to use open flames or candles in connection with assembly areas, dining areas of restaurants or drinking establishments.

Exception: A separate open flame and candle permit is not required at a facility with a valid place of assembly permit.

**[S] 105.5.41 Open flames, open flame devices and flame effects before an audience.** An operational permit is required to use open flames, open flame devices, flame effects, fire or burning before an audience in connection with Group A, B or E occupancies, covered malls or outdoor assembly events.

**Exception:** A permit is not required for the use of flame effects outdoors, unless located at an outdoor assembly event.

~~((105.5.37))~~ **105.5.42 Organic coatings.** An operational permit is required for any organic-coating manufacturing operation producing more than 1 gallon (4 L) of an organic coating in one day.

**[S] ~~((105.5.38))~~ 105.5.43 Outdoor assembly event.** An operational permit is required to conduct an *outdoor assembly event* where planned attendance exceeds ~~((1,000 persons))~~ 499 persons, or 99 persons where enclosures or barricades confine attendees.

**[S] ~~((105.5.39))~~ 105.5.44 Places of assembly.** An operational permit is required to operate a place of assembly with an occupant load of 100 or more.

~~((105.5.40))~~ **105.5.45 Plant extraction systems.** An operational permit is required to use plant extraction systems.

~~((105.5.41))~~ **105.5.46 Private fire hydrants.** An operational permit is required for the removal from service, use or operation of private fire hydrants.

**Exception:** A permit is not required for private industry with trained maintenance personnel, private fire brigade or fire departments to maintain, test and use private hydrants.

~~((105.5.42))~~ **105.5.47 Pyrotechnic special effects material.** An operational permit is required for use and handling of pyrotechnic special effects material.

~~((105.5.43))~~ **105.5.48 Pyroxylin plastics.** An operational permit is required for storage or handling of more than 25 pounds (11 kg) of cellulose nitrate (pyroxylin) plastics, and for the assembly or manufacture of articles involving pyroxylin plastics.

**[S] ~~((105.5.44))~~ 105.5.49 Refrigeration equipment.** An operational permit is required to operate a mechanical refrigeration unit or system regulated by Chapter 6.

**Exception:** Refrigeration systems that have a valid annual mechanical permit from the Seattle Department of Construction and Inspections.

**[S] ~~((105.5.45))~~ 105.5.50 Repair garages, ~~((and motor fuel dispensing facilities.))~~** An operational permit is required for operation of repair garages.

~~((105.5.46))~~ **105.5.51 Rooftop heliports.** An operational permit is required for the operation of a rooftop heliport.

**[S] ~~((105.5.47))~~ 105.5.52 Spraying or dipping.** An operational permit is required to conduct a spraying or dipping operation utilizing *flammable* or *combustible liquids*, or the application of combustible powders regulated by Chapter 24.

**Exception:** Mobile spray coaters licensed by, and meeting the requirements of, the Puget Sound Clean Air Agency.

#### **105.5.52 Point of Information**

A no-fee operational permit is required for spraying operations utilizing water-based paints in accordance with Chapter 24.

**[S] ~~((105.5.48))~~ 105.5.53 Storage of tires, scrap tires and tire byproducts.** An operational permit is required to establish, conduct or maintain outdoor storage of 500 or more tires and scrap tires ~~((and))~~ or tire byproducts that exceeds 2,500 cubic feet (71 m<sup>3</sup>) of total volume, ~~((of scrap tires.))~~ and for indoor storage of tires and tire byproducts when required by Section 105.5.10 or 105.5.26.

**[S] 105.5.54 Temporary assembly occupancy.** A temporary assembly operational permit is required for any area to be used for the assembly of more than 100 persons or where temporary alterations are made to the existing means of egress, character, or use of any building or facility used for the gathering of 50 or more people. Plans shall be submitted to the *fire code official* at least 30 days prior to the event where temporary *alterations* are made to the existing *means of egress*. The number of such permits for any building or structure, or portion thereof, other than existing Group A occupancies, is limited to one per quarter. Additional permits may be issued where application for a change of use for the building, or structure, or portion thereof, has been *approved* by the Seattle Department of Construction and Inspections (SDCI).

**[S] ~~((105.5.49))~~ 105.5.55 Temporary membrane structures and tents.** ~~((An operational permit is required to operate an air-supported temporary membrane structure, a temporary *special-event structure* or a tent having an area in excess of 400 square feet (37 m<sup>2</sup>).))~~ See Section 105.6.24.

**~~((Exceptions:~~**

1. Tents used exclusively for recreational camping purposes.

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2. Tents open on all sides, which comply with all of the following:

2.1. Individual tents having a maximum size of 700 square feet (65 m<sup>2</sup>).

2.2. The aggregate area of multiple tents placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m<sup>2</sup>) total.

2.3. A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be provided.)

~~((405.5.50))~~ **105.5.56 Tire-rebuilding plants.** An operational permit is required for the operation and maintenance of a tire-rebuilding plant.

~~((405.5.51))~~ **105.5.57 Waste handling.** An operational permit is required for the operation of wrecking yards, junk yards and waste material-handling facilities.

~~((405.5.52))~~ **105.5.58 Wood products.** An operational permit is required to store chips, hogged material, lumber or plywood in excess of 200 cubic feet (6 m<sup>3</sup>).

➔ **[S][A] 105.6 Required ~~((construction))~~ installation permits.** The *fire code official* is authorized to issue ~~((construction))~~ installation permits for work as set forth in Sections 105.6.1 through 105.6.24.

### **105.6 Point of Information**

Building permits for construction are issued by the Seattle Department of Construction and Inspections (SDCI). This code does not require separate Fire Department-issued construction permits for the following systems and equipment:

- Automatic fire-extinguishing systems.
- Emergency responder radio coverage systems.
- Fire alarm and detection systems and related equipment.
- Fire pump and related equipment.
- Smoke control or smoke exhaust systems.
- Solar photovoltaic power systems.
- Standpipe systems.

### **Fire Department Installation and Operational Permits**

In many cases, an SFD Installation Permit and/or Annual Permit is also required when building construction is completed and occupancy or use commences. If a Fire Department installation permit is required and an operational permit is also required, the *approved* installation permit is considered the initial operating permit, valid for one year. For a list of required SFD Annual Assembly Permits, see SMC 22.602.045.A. For a list of required SFD Hazardous Materials and Processes Permits, see SMC 22.602.045.C.

**[S][A] 105.6.1 Automatic fire-extinguishing systems.** A construction permit issued by the Seattle Department of Construction and Inspections is required for installation of or modification to an automatic fire-extinguishing system. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

**[S][A] 105.6.2 Compressed gases.** Where the *compressed gases* in use or storage exceed the amounts listed in Table ~~((405.5.9))~~ 105.5.11, ~~((a construction))~~ an installation permit is required to install, repair damage to, abandon, remove, place temporarily out of service, or close or substantially modify a *compressed gas* system.

#### **Exceptions:**

1. Routine maintenance.
2. For emergency repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.

**[S][A] 105.6.3 Cryogenic fluids.** ~~((A construction))~~ An installation permit is required for installation of or *alteration* to outdoor stationary *cryogenic fluid* storage systems where the system capacity exceeds the amounts listed in Table ~~((405.5.11))~~ 105.5.13. Maintenance performed in accordance with this code is not considered to be an *alteration* and does not require a construction permit.

**[S][A] 105.6.4 Emergency responder communication coverage system.** A construction permit issued by the Seattle Department of Construction and Inspections is required for installation of or modification to in-building, two-way emergency responder communication coverage systems and related equipment. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

**[S] 105.6.5 Energy storage systems.** ~~((A construction))~~ An installation permit is required to install energy storage systems regulated by Section 1207.

**[S][A] 105.6.6 Fire alarm and detection systems and related equipment.** A construction permit issued by the Seattle Department of Construction and Inspections is required for installation of or modification to fire alarm and detection



systems and related equipment. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

**[S][A] 105.6.7 Fire pumps and related equipment.** A construction permit issued by the Seattle Department of Construction and Inspections is required for installation of or modification to fire pumps and related fuel tanks, jockey pumps, controllers and generators. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

**[S][A] 105.6.8 Flammable and combustible liquids.** (~~A construction~~) An installation permit is required:

1. To install, repair or modify a pipeline for the transportation of *flammable* or *combustible liquids*.
2. To install, construct or alter tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where *flammable* and *combustible liquids* are produced, processed, transported, stored, dispensed or used.
3. To install, alter, remove, abandon or otherwise dispose of a *flammable* or *combustible liquid tank*.

**[S][A] 105.6.9 Fuel cell power systems.** (~~A construction~~) An installation permit is required to install *stationary fuel cell power systems*.

**[S][A] 105.6.10 Gas detection systems.** (~~A construction~~) An installation permit is required for the installation of or modification to gas detection systems. Maintenance performed in accordance with this code is not considered a modification and shall not require a permit.

**[S][A] 105.6.11 Gates and barricades across fire apparatus access roads.** (~~A construction~~) An installation permit is required for the installation of or modification to a gate or barricade across a fire apparatus access road.

**[S][A] 105.6.12 Hazardous materials.** (~~A construction~~) An installation permit is required to install, repair damage to, abandon, remove, place temporarily out of service, or close or substantially modify a storage facility or other area regulated by Chapter 50 where the hazardous materials in use or storage exceed the amounts listed in Table (~~(105.5.22)~~) 105.5.24.

**Exceptions:**

1. Routine maintenance.
2. For repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.

**[S][A] 105.6.13 High-piled combustible storage.** (~~A construction~~) An installation permit is required for the installation of or modification to a structure with more than 500 square feet (46 m<sup>2</sup>), including aisles, of *high-piled combustible storage*. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

**[S][A] 105.6.14 Industrial ovens.** (~~A construction~~) An installation permit is required for installation of industrial ovens regulated by Chapter 30.

**Exceptions:**

1. Routine maintenance.
2. For repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.

**[S][A] 105.6.15 LP-gas.** (~~A construction~~) An installation permit is required for installation of or modification to an LP-gas system. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

**[S][A] 105.6.16 Motor vehicle repair rooms and booths.** (~~A construction~~) An installation permit is required to install or modify a motor vehicle repair room or booth. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

**[S][A] 105.6.17 Plant extraction systems.** (~~A construction~~) An installation permit is required for installation of or modification to plant extraction systems. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

**[S][A] 105.6.18 Private fire hydrants.** A construction permit issued by the Seattle Department of Construction and Inspections is required for the installation or modification of private fire hydrants. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

**[S][A] 105.6.19 Smoke control or smoke exhaust systems.** Construction permits issued by the Seattle Department of Construction and Inspections are required for installation of or alteration to smoke control or smoke exhaust systems. Maintenance performed in accordance with this code is not considered to be an alteration and does not require a permit.

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[S][A] **105.6.20 Solar photovoltaic power systems.** A construction permit issued by the Seattle Department of Construction and Inspections is required to install or modify solar photovoltaic power systems. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[S][A] **105.6.21 Special event structure.** A single ~~((construction))~~ installation permit is required to erect and take down a *temporary special event structure*.

[S][A] **105.6.22 Spraying or dipping.** ~~((A construction))~~ An installation permit is required to install or modify a spray room, dip tank or booth. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[S][A] **105.6.23 Standpipe systems.** A construction permit issued by the Seattle Department of Construction and Inspections is required for the installation, modification or removal from service of a standpipe system. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[S][A] **105.6.24 Temporary membrane structures and tents.** ~~((A construction))~~ An installation permit is required to erect an air-supported temporary membrane structure, a temporary stage canopy or a tent having an area in excess of 400 square feet (37 m<sup>2</sup>) ~~((-))~~ if all of the conditions are met:

1. The membrane structure or tent will be erected for a time period not to exceed four weeks;
2. The membrane structure or tent will be located at least 200 feet (60 960 mm) from shorelines;
3. No stage, platform, bleacher or similar structure greater than 4 feet (1219 mm) in height will be installed inside the membrane structure or tent;
4. The membrane structure or tent will not be attached to a building or other permanent structure for support; and
5. The installation permit does not propose foul weather use, or a structure of unusual shape, unusual location or large area or height.

### **Exceptions:**

- Tents used exclusively for recreational camping purposes.
- Funeral tents and curtains, or extensions attached thereto, when used for funeral services.
- Tents and awnings open on all sides, which comply with all of the following:
  - Individual tents shall have a maximum size of 700 square feet (65 m<sup>2</sup>).
  - The aggregate area of multiple tents placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m<sup>2</sup>) total.
  - A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be maintained.

### **105.6.24 Point of Information**

If any one of the above-noted conditions (subsections 105.6.24(1) through (5)) is not met, a permit for the membrane structure or tent may be required from the Seattle Department of Construction and Inspections.

[W][S] **105.6.25 Underground supply piping for automatic sprinkler system.** A construction permit issued by the Seattle Department of Construction and Inspections is required for the installation of the portion of the dedicated underground water supply piping, public or private, supplying a water-based fire protection system. The permit shall apply to all underground piping and appurtenances downstream of the first control valve on the lateral piping or service line from the distribution main to one foot (25 mm) above finished floor of the facility with the fire protection system. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

### **Exceptions:**

- When the underground piping is installed by the aboveground piping contractor.
- Underground piping serves a fire protection system installed in accordance with NFPA 13D.

## SECTION 106 CONSTRUCTION DOCUMENTS

[S][A] **106.1 Submittals.** *Construction documents* and supporting data shall be submitted in ~~((two))~~ one or more sets with each application for a permit and in such form and detail as required by the *fire code official*. The construction documents shall be prepared by a registered design professional where required by the ~~((statutes of the jurisdiction in which the project is to be constructed))~~ *fire code official*.

**Exception:** The *fire code official* is authorized to waive the submission of *construction documents* and supporting data not required to be prepared by a *registered design professional* if it is found that the nature of the work applied for is such that review of *construction documents* is not necessary to obtain compliance with this code.

[S][A] **106.2 Examination of documents.** The *fire code official* ~~((shall))~~ may examine or cause to be examined the accompanying *construction documents* and shall ascertain by such examinations whether the work indicated and described is in accordance with the requirements of this code.

[A] **106.2.1 Information on construction documents.** *Construction documents* shall be drawn to scale on suitable material. Documents in a digital format are allowed to be submitted where *approved* by the *fire code official*. *Construction documents* shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations as determined by the *fire code official*.

[A] **106.2.2 Fire protection system shop drawings.** Shop drawings for the fire protection system(s) shall be submitted to indicate compliance with this code and the *construction documents*, and shall be *approved* prior to the start of installation. Shop drawings shall contain all information as required by the referenced installation standards in Chapter 9.

[A] **106.2.3 Applicant responsibility.** It shall be the responsibility of the applicant to ensure that the *construction documents* include all of the fire protection requirements and the shop drawings are complete and in compliance with the applicable codes and standards.

[A] **106.2.4 Approved documents.** *Construction documents approved* by the *fire code official* are *approved* with the intent that such *construction documents* comply in all respects with this code. Review and approval by the *fire code official* shall not relieve the applicant of the responsibility of compliance with this code.

[S][A] **106.2.4.1 Phased approval.** The *fire code official* is authorized to issue a permit for the construction of part of a structure, system or operation before the *construction documents* for the whole structure, system or operation have been submitted, ~~((provided that))~~ if adequate information and detailed statements have been filed complying with pertinent requirements of this code. The holder of such permit for parts of a structure, system or operation shall proceed at the holder's own risk ~~((with the building operation))~~ and without assurance that a permit for the entire structure, system or operation will be granted.

[S][A] **106.3 Amended construction documents.** Work shall be installed in accordance with the *approved construction documents*, and when required by the *fire code official* any changes made during construction that are not in compliance with the *approved construction documents* shall be resubmitted for approval as an amended set of *construction documents*, when required by the *fire code official*.

[S] ~~(([A] **106.4 Retention of construction documents.** One set of *construction documents* shall be retained by the *fire code official* for a period of not less than 180 days from date of completion of the permitted work, or as required by state or local laws. One set of *approved construction documents* shall be returned to the applicant, and said set shall be kept on the site of the building or work at all times during which the work authorized thereby is in progress.))~~

## SECTION 107 FEES

[S][A] **107.1 Fees.** A permit shall not be issued until the fees have been paid, nor shall an amendment to a permit be released until the additional fee, if any, has been paid.

**Exception:** Those permits for which the *fire code official*, pursuant to Seattle Municipal Code Chapter 22.600, authorizes invoices to be sent for the fees after the permits are issued.

[S][A] **107.2 Schedule of permit fees.** Where a permit is required, a fee for each permit shall be paid as required, in accordance with the schedule ~~((as))~~ established by the ~~((applicable))~~ governing authority.

[S] ~~((**107.3 Permit valuations.** The applicant for a permit shall provide an estimated permit value at the time of application. Permit valuations shall include the total value of work, including materials and labor, for which the permit is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. If, in the opinion of the *fire code official*, the valuation is underestimated on the application, the permit shall be denied unless the applicant can show detailed estimates to meet the approval of the *fire code official*. Final permit valuation shall be set by the *fire code official*.)~~

[S][A] ~~((**107.4 Work commencing before permit issuance.** A person who commences any work, activity or operation regulated by this code before obtaining the necessary permits shall be subject to a fee established by the applicable governing authority, which shall be in addition to the required permit fees.))~~

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[S][A] ~~((107.5))~~ **107.3 Related fees.** The payment of the fee for the construction, *alteration*, removal or demolition of work done in connection ~~((to))~~ or concurrently with the work or activity authorized by a permit ~~((shall))~~ does not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.

[A] ~~((107.6))~~ **107.4 Refunds.** The applicable governing authority is authorized to establish a refund policy.

## SECTION 108 INSPECTIONS

[A] **108.1 Inspection authority.** The *fire code official* is authorized to enter and examine any building, structure, marine vessel, vehicle or premises in accordance with Section 104.3 for the purpose of enforcing this code.

[A] **108.2 Inspections.** The *fire code official* is authorized to conduct such inspections as are deemed necessary to determine the extent of compliance with the provisions of this code and to approve reports of inspection by *approved* agencies or individuals. Reports of such inspections shall be prepared and submitted in writing for review and approval. Inspection reports shall be certified by a responsible officer of such *approved* agency or by the responsible individual. The *fire code official* is authorized to engage such expert opinion as deemed necessary to report on unusual, detailed or complex technical issues subject to the approval of the governing body.

[A] **108.2.1 Inspection requests.** It shall be the duty of the holder of the permit or their duly authorized agent to notify the *fire code official* when work is ready for inspection. It shall be the duty of the permit holder to provide access to and means for inspections of such work that are required by this code.

[A] **108.2.2 Approval required.** Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the *fire code official*. The *fire code official*, on notification, shall make the requested inspections and shall either indicate the portion of the construction that is satisfactory as completed, or notify the permit holder or his or her agent wherein the same fails to comply with this code. Any portions that do not comply shall be corrected, and such portion shall not be covered or concealed until authorized by the *fire code official*.

[A] **108.3 Concealed work.** It shall be the duty of the permit applicant to cause the work to remain visible and able to be accessed for inspection purposes. Where any installation subject to inspection prior to use is covered or concealed without having first been inspected, the *fire code official* shall have the authority to require that such work be made visible and able to be accessed for inspection. Neither the *fire code official* nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

[A] **108.4 Approvals.** Approval as the result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel provisions of this code or of other ordinances of the jurisdiction shall not be valid.

[S] 108.5 Special inspections. The *fire code official* is authorized to appoint qualified persons or agencies having special technical skills as special inspectors or plan reviewers and accept their inspection, plan review and evaluation of specialized fire protection equipment or systems.

[S] 108.5.1 Other inspections. The *fire code official* is authorized to accept inspections performed by other jurisdictions and agencies and honor permits and certificates issued by other jurisdictions for activities regulated by this code, upon presentation to the *fire code official* of satisfactory evidence that such inspections, permits and certificates are substantially in accord with the fire safety requirements of this code.

## SECTION 109 MAINTENANCE

[A] **109.1 Maintenance of safeguards.** Where any device, equipment, system, condition, arrangement, level of protection, or any other feature is required for compliance with the provisions of this code, or otherwise installed, such device, equipment, system, condition, arrangement, level of protection, or other feature shall thereafter be continuously maintained in accordance with this code and applicable referenced standards.

[A] **109.2 Testing and operation.** Equipment requiring periodic testing or operation to ensure maintenance shall be tested or operated as specified in this code.

[A] **109.2.1 Reinspection and testing.** Where any work or installation does not pass an initial test or inspection, the necessary corrections shall be made so as to achieve compliance with this code. The work or installation shall then be resubmitted to the *fire code official* for inspection and testing.

[S][A] **109.3 Recordkeeping.** A record of periodic inspections, tests, servicing and other operations and maintenance shall be maintained on the premises or other *approved* location for not less than 3 years, or a different period of time where specified in this code or referenced standards. ~~((Records))~~ In accordance with applicable law, records shall be made available for inspection by the *fire code official*, and a copy of the records shall be provided to the *fire code official* on request.

The *fire code official* is authorized to prescribe the form and format of such recordkeeping. The *fire code official* is authorized to require that certain required records be filed with the *fire code official*.

**[A] 109.4 Supervision.** Maintenance and testing shall be under the supervision of a responsible person who shall ensure that such maintenance and testing are conducted at specified intervals in accordance with this code.

**[S] 109.5 Rendering equipment inoperable.** Portable or fixed fire-extinguishing systems or devices, and fire-warning systems, shall be provided with *ready access* and shall not be rendered inoperative, except as necessary during emergencies, maintenance, repairs, *alterations*, drills or prescribed testing.

**Exception:** When *approved by the fire code official*.

**[S][A] 109.6 Overcrowding.** Overcrowding or admittance of any person beyond the *approved* capacity of a building or a portion thereof (~~shall not be allowed~~) is prohibited. The *fire code official*, on finding any overcrowding conditions or obstructions in *aisles*, passageways or other *means of egress*, or on finding any condition that constitutes a life safety hazard, (~~shall be~~) is authorized to direct actions be taken to reduce the overcrowding or to cause the event to be stopped until such condition or obstruction is corrected.

## SECTION 110 SERVICE UTILITIES

**[A] 110.1 Authority to disconnect service utilities.** The *fire code official* shall have the authority to authorize disconnection of utility service to the building, structure or system in order to safely execute emergency operations or to eliminate an immediate hazard. The *fire code official* shall notify the serving utility and, where possible, the *owner* or the *owner's* authorized agent and the occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnection, then the *owner*, the *owner's* authorized agent or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

## SECTION 111 MEANS OF APPEALS

### 111 Point of Information

For information on appeals procedures, see Seattle Fire Department Information Bulletin *Requesting a Review by the Seattle Fire Code Appeals Board* at: [https://www.seattle.gov/documents/Departments/Fire/Business/CAM5972\\_FireCodeAppeals.pdf](https://www.seattle.gov/documents/Departments/Fire/Business/CAM5972_FireCodeAppeals.pdf).

**[S] 111.1 Appeals.** Appeals from decisions or actions pertaining to the application and interpretation of this code, except for revocations, suspensions, and denials of renewals pursuant to Section 105.4 and enforcement actions pursuant to Sections 112.3, 112.4, and 113, shall first be addressed to the fire code official. If not resolved with the fire code official, the appellant may submit a written request to the fire code official for a review by the Fire Code Appeals Board in accordance with Appendix A, all applicable by-laws, rules, regulations, and ordinances. The result of this review is advisory only, in accordance with Seattle Municipal Code Section 3.16.300. Following receipt of the Fire Code Appeals Board recommendation the fire chief, who shall not have acted as the fire code official in the first appeal of the application or interpretation of the code, shall issue a final written decision.

**[S] (~~[A] 111.1 Board of appeals established.~~** In order to hear and decide appeals of orders, decisions or determinations made by the *fire code official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *fire code official*.)

**[A] 111.2 Limitations on authority.** ~~An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code or interpret the administration of this code.~~

**[A] 111.3 Qualifications.** ~~The board of appeals shall consist of members who are qualified by experience and training to pass on matters pertaining to hazards of fire, explosions, hazardous conditions or fire protection systems, and are not employees of the jurisdiction.~~

**[A] 111.4 Administration.** ~~The fire code official shall take immediate action in accordance with the decision of the board.)~~

## SCOPE AND ADMINISTRATION

### SECTION 112 VIOLATIONS

[S][A] **112.1 Unlawful acts.** It shall be unlawful for a person, firm or corporation to erect, construct, alter, repair, remove, demolish or utilize a building, occupancy, premises or system regulated by this code, or cause same to be done, in conflict with or in violation of any of the provisions of this code. It is a violation of this code for any person to fail to comply with this code or with any order issued by the fire code official.

[S][A] **112.2 Owner/occupant responsibility.** Correction and abatement of violations of this code shall be the responsibility of the *owner* or the *owner's* authorized agent. ~~((Where))~~ If an occupant, operator, or other person creates, or allows to be created, hazardous conditions in violation of this code, the occupant, operator, or other person ~~((shall))~~ may be held responsible for the abatement of such hazardous conditions.

[S][A] **112.3 ~~((Notice of violation))~~ Order to comply.** Where the *fire code official* finds a building, premises, vehicle, *vessel*, storage facility or outdoor area that is in violation of this code, the *fire code official* is authorized to ~~((prepare))~~ issue a written ~~((notice of violation))~~ order to comply describing the ~~((conditions deemed unsafe))~~ violation and, ~~((where))~~ when immediate compliance is not ~~((immediate))~~ required, specifying a time for ~~((reinspection))~~ achieving compliance. Nothing in this Section 112.3 shall be deemed to limit or preclude any other enforcement action or proceeding, and nothing in this Section 112 shall be deemed to obligate or require the fire code official to issue an order to comply prior to the imposition of civil or criminal penalties or remedies.

[S][A] **112.3.1 Service.** ~~((A notice of violation))~~ An order to comply issued pursuant to this code shall be served on the owner, the owner's authorized agent, operator, occupant or other person(s) responsible for the condition or violation, either by personal service ~~((, mail or by delivering the same to, and leaving it with, some person of responsibility on the premises))~~ or by first-class mail. For unattended or abandoned locations, a copy of such ~~((notice of violation shall))~~ order to comply may be posted on the premises in a conspicuous place at or near the entrance to such premises and the ~~((notice of violation))~~ order to comply shall be mailed by ~~((certified mail with return receipt requested or a certificate of mailing,))~~ first-class mail to the last known address of the *owner*, ~~((the))~~ *owner's* authorized agent, ~~((or))~~ occupant, or any other person(s) responsible for the condition or violation. Service by mail shall be deemed served on the third day following the day upon which the order was placed in the mail, unless the third day falls on a Saturday, Sunday, or legal holiday, in which event the order shall be deemed received on the next day which is not a Saturday, Sunday, or legal holiday.

[S] 112.3.1.1 Amending orders to comply. An order to comply may be amended at any time to correct clerical errors, correct other errors, or cite additional authority for a stated violation, provided such amendments do not prejudice substantial rights.

[S][A] **112.3.2 Compliance with orders ~~((and notices))~~ to comply.** ~~((A notice of violation))~~ An order to comply issued or served as provided by this code shall be complied with by the owner, ~~((the))~~ owner's authorized agent, operator, occupant or other person(s) responsible for the condition or violation to which the ~~((notice of violation))~~ order to comply pertains.

[S][A] **112.3.3 Prosecution of violations.** If the ~~((notice of violation))~~ order to comply is not complied with ~~((promptly))~~ by the time specified in the order, the *fire code official* is authorized to request the legal counsel of the jurisdiction to institute the appropriate legal proceedings at law or in equity to restrain, correct or abate such violation, ~~((or))~~ to require removal or termination of the unlawful occupancy of the structure in violation of the provisions of this code or of the order, or ~~((direction made pursuant hereto))~~ to collect a penalty for violation.

[A] **112.3.4 Unauthorized tampering.** Signs, tags or seals posted or affixed by the *fire code official* shall not be mutilated, destroyed or tampered with, or removed, without authorization from the *fire code official*.

[S] **112.3.5 Review by the fire code official.** Any person aggrieved by an order to comply issued by the *fire code official* pursuant to this Section 112.3 may obtain a review of the order by requesting such review in writing within ten days after service of the order. When the last day of the period so computed is a Saturday, Sunday, or legal holiday, the period shall run until 5 p.m. on the next business day. The request shall be in writing, and within 30 days of the request the aggrieved person shall submit any additional information to be considered for the review. Before the deadline for submission of information, any person aggrieved by or interested in the order to comply (including any persons served the order to comply and the complainant) may submit any additional information in the form of written material to the *fire code official* for consideration as part of the review.

[S] 112.3.5.1 Representative review. A review may be made by a representative of the *fire code official* who is familiar with the case and the applicable ordinances. The *fire code official's* representative will review all additional information received by the deadline for submission of information. The reviewer may also request clarification of information received and a site visit.

[S] 112.3.5.2 Decision. After review of the additional information, the *fire code official* may sustain the order to comply, withdraw the order to comply, continue the review to a date certain for receipt of additional information, or modify the order to comply, which may include an extension of the compliance date.

[S] 112.3.5.3 Final order. The *fire code official* shall issue a final order containing the decision of the *fire code official* and shall cause the same to be mailed by first-class mail to the *person(s)* named on the order to comply. The *fire code official* may file the final order with the King County Recorder's Office.

[S] 112.3.5.4 Extension of compliance date. The *fire code official* may grant an extension of time for compliance with any order, whether pending or final, upon the *fire code official's* finding that substantial progress toward compliance has been made and that the public will not be adversely affected by the extension. An extension of time may be revoked by the *fire code official* if it is shown that the conditions at the time the extension was granted have changed, the *fire code official* determines that a party is not performing corrective actions as agreed, or if the extension creates an adverse effect on the public. The date of revocation shall then be considered the compliance date.

[S] 112.3.6 Penalties. Penalties shall be in accordance with this section.

[S][A] ((412.4)) 112.3.6.1 ((Violation)) Civil penalties. ((Persons)) Any person who shall violate a provision of this code or shall fail to comply with any of the requirements thereof or who shall erect, install, alter, repair or do work in violation of the *approved construction documents* or directive of the *fire code official*, or of a permit or certificate used under provisions of this code, shall be ((guilty of a [SPECIFY OFFENSE], punishable by a fine of not more than [AMOUNT] dollars or by imprisonment not exceeding [NUMBER OF DAYS], or both such fine and imprisonment)) subject to a cumulative civil penalty in an amount not to exceed \$1,000 per day for each violation from the time the violation occurs or begins, until compliance is achieved. ((Each day that a violation continues after due notice has been served shall be deemed a separate offense.)) The penalty shall be collected by civil action brought in the name of the City. The *fire code official* shall notify the City Attorney in writing of the name of any person, firm, or corporation subject to the penalty, and the City Attorney shall, with the assistance of the *fire code official*, take appropriate action to collect the penalty. In any civil action for a penalty, the City has the burden of proving by a preponderance of the evidence that a violation exists or existed.

[S] 112.3.6.2 Alternative criminal penalty. Any person who shall violate a provision of this code or shall fail to comply with any of the requirements thereof or who shall erect, install, alter, repair or do work in violation of the *approved construction documents* or directive of the *fire code official*, or of a permit or certificate used under provisions of this code, shall be guilty of a gross misdemeanor subject to the provisions of Seattle Municipal Code Chapters 12A.02 and 12A.04, except that absolute liability shall be imposed for such a violation or failure to comply and none of the mental states described in Section 12A.04.030 need be proved. The *fire code official* may request the City Attorney prosecute such violations criminally as an alternative to the civil penalties provision. Each day that a violation continues shall be deemed a separate offense.

[S][A] ((412.4.1)) 112.3.6.3 Abatement of violation. In addition to the imposition of ((the)) civil and criminal penalties, ((herein described,)) the *fire code official* is authorized to institute appropriate action to prevent unlawful construction; ((or)) to restrain, correct or abate a violation; ((or)) to prevent illegal occupancy of a structure or premises; or to stop an illegal act, conduct of business or occupancy of a structure on or about any premises.

[S] 112.4 Citations. Violations or failure to comply with any of the following may be enforced under the citation or criminal provisions set forth in this Section 112.4:

1. Section 109.6, regarding overcrowding or admittance of any person beyond the *approved* capacity of a building, room, or space.
2. Section 1032.2, regarding failing to maintain the reliability of the means of egress.
3. Section 901.8, regarding removal of or tampering with equipment.
4. Section 114.1.1, regarding unsafe conditions that involve illegal or improper occupancy or inadequate maintenance, or that are otherwise dangerous to human life or public welfare.
5. Section 113, regarding failing to comply with a stop use or work order.
6. Section 510.6, Section 901.6 and Administrative Rule 9.02, regarding inspection, testing, maintenance and repair of fire protection and life safety systems and emergency responder communication enhancement systems.
7. Section 510.6, Section 901.6 and Administrative Rule 9.02, regarding failing to file reports of the test for the inspection, testing, maintenance and repair of fire protection and life safety systems and emergency responder communication enhancement systems within the required timeframes.
8. Section 901.12, regarding preventable fire alarms.
9. Section 901.4.8, regarding any requirement of this code to obtain an *approved* certification before performing installation, testing, or maintenance and repair of fire protection and life safety systems.
10. Sections 105.1.1 and 105.3, regarding failing to obtain a permit required by this code or failing to comply with any condition of a permit issued pursuant to this code.

Any enforcement action or proceeding pursuant to this Section 112.4 shall not affect, limit, or preclude any previous, pending, or subsequent enforcement action or proceeding taken pursuant to Section 112.3.

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**[S] 112.4.1 Documentation.** If after investigation the *fire code official* determines that the standards or requirements of provisions referenced in Section 112.4 have been violated, the *fire code official* may issue a citation to the owner and/or other *person(s)* responsible for the violation. The citation shall include the following information: (1) the name and address of the *person* to whom the citation is issued; (2) a reasonable description of the location of the property on which the violation occurred; (3) a separate statement of each standard or requirement violated; (4) the date of the violation; (5) a statement that the *person* cited must respond to the citation within 15 days after service; (6) a space for entry of the applicable penalty; (7) a statement that a response must be sent to the Hearing Examiner and received not later than 5 p.m. on the day the response is due; (8) the name, address, and phone number of the Office of the Hearing Examiner where the citation is to be filed; (9) a statement that the citation represents a determination that a violation has been committed by the *person(s)* named in the citation and that the determination shall be final unless contested as provided in this Section 112.4; and (10) a certified statement of the *fire code official's* representative issuing the citation, authorized by RCW 9A.72.085, setting forth facts supporting issuance of the citation.

**[S] 112.4.2 Service.** The citation may be served by personal service in the manner set forth in RCW 4.28.080 for service of a summons or sent by first-class mail, addressed to the last known address of such *person(s)*. Service shall be complete at the time of personal service, or if mailed, three days following the date of mailing. If a citation sent by first-class mail is returned as undeliverable, service may be made by posting the citation at a conspicuous place on the property.

**[S] 112.4.3 Response to citations.** A *person* must respond to a citation in one of the following ways:

1. Paying the amount of the monetary penalty specified in the citation, in which case the record shall show a finding that the *person* cited committed or is responsible for the violation; or
2. Requesting in writing a mitigation hearing to explain the circumstances surrounding the commission of the violation and to request a reduction of the penalty, and providing an address to which notice of such hearing may be sent. A mitigation hearing cannot occur unless the violation is cured and compliance has been confirmed by the *fire code official* prior to the hearing; or
3. Requesting a contested hearing in writing specifying the reason why the cited violation did not occur or why the *person* cited is not responsible for the violation, and providing an address to which notice of such hearing may be sent.

A response to a citation must be received by the Office of the Hearing Examiner no later than 15 days after the date the citation is served. When the last day of the appeal period so computed is a Saturday, Sunday, or federal or City holiday, the period shall run until 5 p.m. on the next business day. Parties may withdraw an appeal if they no longer wish to request a mitigation hearing or a contested hearing, in which case parties must pay the amount of the monetary penalty specified in the citation and the record shall show a finding that the *person* committed the violation. The *fire code official* may withdraw the citation, in which case it is dismissed and no penalty is due.

**[S] 112.4.4 Failure to respond.** If a *person* fails to respond to a citation within 15 days of service, an order shall be entered by the Hearing Examiner finding that the *person* committed the violation.

**[S] 112.4.5 Mitigation hearings.** Mitigation hearings shall comply with Sections 112.4.5.1 through 112.4.5.5.

**[S] 112.4.5.1 Date and notice.** If a *person* requests a mitigation hearing, the mitigation hearing shall be held within 30 days after written response to the citation requesting a hearing is received by the Hearing Examiner. Notice of the time, place, and date of the hearing shall be sent to the address specified in the request for hearing not less than ten days before the date of the hearing.

**[S] 112.4.5.2 Violations cured before the hearing.** Prior to a mitigation hearing, all violations noted in the citation shall be corrected and compliance with provisions of this code shall be verified by the *fire code official*.

**[S] 112.4.5.3 Procedure at hearing.** The Hearing Examiner shall hold any information that shall not be governed by the Rules of Evidence. The Hearing Examiner shall review the citation and supporting report and documents if those documents are filed by the Fire Department. The *person* cited may present witnesses, but witnesses shall not be compelled to attend. A representative from the Seattle Fire Department may also be present and may present additional information, but attendance by a representative from the Seattle Fire Department is not required.

**[S] 112.4.5.4 Disposition.** The Hearing Examiner shall determine whether the person's explanation justifies reduction of the monetary penalty. Factors that may be considered include:

1. Conditions caused by third parties – the violation was caused by the act, neglect, or abuse of a third party who is not the owner, responsible party, or part of a tenant/landlord agreement with respect to the building address in the violation;
2. Mitigating circumstances outside of the responsible party's control – the responsible party has initiated a good faith effort to resolve the violation timely, however, due to circumstances outside of the responsible party's control, the violation has not been corrected on the compliance time established by the *fire code official*; and



3. For penalties in Section 112.4.8.3, no penalty shall be assessed if any individual who was on or near the premises, or who had viewed a video communication from the premises, called for the dispatch and confirmed a need for Fire Department response.

[S] 112.4.5.5 Entry of order. After hearing the explanation of the *person* cited and any other information presented at the hearing, the Hearing Examiner shall enter an order finding that the *person* cited committed the violation and assessing a monetary penalty in an amount determined pursuant to Section 112.4.8. The Hearing Examiner's decision is the final decision of the City on the matter.

[S] 112.4.6 Contested hearings. Contested hearings shall comply with Sections 112.4.6.1 through 112.4.6.7.

[S] 112.4.6.1 Date and notice. If a *person* requests a contested hearing, the hearing shall be held within 60 days after receipt of the hearing request.

[S] 112.4.6.2 Hearing. Contested hearings shall be conducted pursuant to the procedures for hearing contested cases contained in Seattle Municipal Code Section 3.02.090 and the rules adopted by the Hearing Examiner for hearing contested cases, except as modified by this section. The issues heard at the hearing shall be limited to those that are raised in writing in the response to the citation and that are within the jurisdiction of the Hearing Examiner. The Hearing Examiner may issue subpoenas for the attendance of witnesses and the production of documents.

[S] 112.4.6.3 Sufficiency. No citation shall be deemed insufficient for failure to contain a detailed statement of the facts constituting the specific violation which the *person* cited is alleged to have committed or by reason of defects or imperfections, provided such lack of detail or such defects or imperfections do not prejudice substantial rights of the *person* cited.

[S] 112.4.6.4 Amendment of citation. A citation may be amended prior to the conclusion of the hearing to conform to the evidence presented if substantial rights of the *person* cited are not thereby prejudiced.

[S] 112.4.6.5 Evidence at hearing. The certified statement or declaration authorized by RCW 9A.72.085 shall be prima facie evidence that a violation occurred and that the *person* cited is responsible. The certified statement or declaration authorized under RCW 9A.72.085 and any other evidence accompanying the report shall be admissible without further evidentiary foundation. Any certifications or declarations authorized under RCW 9A.72.085 shall also be admissible without further evidentiary foundation. The *person* cited may rebut the Seattle Fire Department's evidence and establish that the cited violation(s) did not occur or that the *person* contesting the citation is not responsible for the violation.

[S] 112.4.6.6 Disposition. If the citation is sustained at the hearing, the Hearing Examiner shall enter an order finding that the *person* cited committed the violation and impose the applicable penalty. The Hearing Examiner may reduce the monetary penalty in accordance with the mitigation provisions in Section 112.4.5. If the Hearing Examiner determines that the violation did not occur, the Hearing Examiner shall enter an order dismissing the citation.

[S] 112.4.6.7 Final decision. The Hearing Examiner's decision is the final decision of the City.

[S] 112.4.7 Failure to appear for hearing. Failure to appear for a requested hearing will result in an order being entered finding that the *person* cited committed the violation stated in the citation and assessing the penalty specified in the citation. For good cause shown and upon terms the Hearing Examiner deems just, the Hearing Examiner may set aside an order entered upon a failure to appear.

[S] 112.4.8 Penalties. Penalties shall be in accordance with Sections 112.4.8.1 through 112.4.8.3.

[S] 112.4.8.1 The first time that a *person(s)* is found to have violated one of the provisions referenced in Section 112.4, except subsection 112.4(8), the *person(s)* shall be subject to a penalty of \$373.

[S] 112.4.8.2 The second time, and any subsequent times, that a *person(s)* is found to have violated one of the provisions referenced in Section 112.4, except subsection 112.4(8), within a 12-month period, the *person(s)* shall be subject to a penalty of \$746 for each such violation.

[S] 112.4.8.3 The *person(s)* found to have violated provisions referenced in subsection 112.4(8) shall be subject to the following penalties:

1. No penalty for the first violation within a quarter of a calendar year.
2. Three hundred seventy-three dollars if at least two but fewer than six violations have occurred in the same quarter of a calendar year.
3. Seven hundred forty-six dollars if at least six but fewer than nine violations have occurred in the same quarter of a calendar year.
4. Nine hundred dollars if at least nine violations have occurred in the same quarter of a calendar year.

[S] 112.4.8.4 Alternative criminal penalty. Any *person* who shall violate a provision of this code or shall fail to comply with any of the requirements thereof or who shall erect, install, alter, repair, or do work in violation of the *approved construction documents* or directive of the *fire code official*, or of a permit or certificate used under provisions of this code, shall be guilty of a gross misdemeanor subject to the provisions of Seattle Municipal Code Chapters 12A.02

## SCOPE AND ADMINISTRATION

and 12A.04, except that absolute liability shall be imposed for such a violation or failure to comply and none of the mental states described in Section 12A.04.030 need be proved. The fire code official may request the City Attorney prosecute such violations criminally as an alternative to the civil penalties provision. Each day that a violation continues shall be deemed a separate offense.

[S] 112.4.8.5 Abatement of violation. In addition to the imposition of civil and criminal penalties, the fire code official is authorized to institute appropriate action to prevent unlawful construction; to restrain, correct, or abate a violation; to prevent illegal occupancy of a structure or premises; or to stop an illegal act, conduct of business, or occupancy of a structure on or about any premises.

[S] 112.4.9 Collection of penalties. If the person or entity cited fails to pay a penalty imposed pursuant to this Section 112.4, the penalty may be referred to a collection agency. The cost to the City for the collection services will be assessed as costs, at the rate agreed to between the City and the collection agency and added to the penalty. Alternatively, the City may pursue collection in any manner allowed by law.

[S] 112.4.10 Each day a separate violation. Each day a person or entity violates or fails to comply with a provision referenced in Section 112.4 may be considered a separate violation for which a citation may be issued.

[S] 112.4.11 Additional relief. The fire code official may seek legal or equitable relief at any time to enjoin any acts or practices that violate provisions referenced in Section 112.4 or abate any condition that constitutes a nuisance, and those costs may be added to the penalty.

## [S] SECTION 113 STOP WORK OR USE ORDER

[S][A] 113.1 Authority. Where the fire code official finds any work or use regulated by this code being performed in a manner contrary to the provisions of this code, or in a dangerous or unsafe manner, the fire code official is authorized to issue a stop work or use order.

[S][A] 113.2 Issuance. The stop work or use order shall be in writing and shall be given to the owner of the property, the owner's authorized agent or the person performing the work or use. Upon issuance of a stop work or use order, the cited work or use shall immediately cease. The stop work or use order shall state the reason for the order and the conditions under which the cited work or use is authorized to resume.

[S][A] 113.3 Emergencies. Where an emergency exists, the fire code official shall not be required to give a written notice prior to stopping the work or use.

[S][A] 113.4 Failure to comply. ~~((Any))~~ It is a violation of this code for any person ~~((who shall))~~ to continue any work or use after having been served with a stop work or use order, except such work or use as that person is directed to perform to remove a violation or unsafe condition. ~~((, shall be subject to fines established by the authority having jurisdiction.))~~

## SECTION 114 UNSAFE BUILDINGS, STRUCTURES, PREMISES, VEHICLES, VESSELS OR EQUIPMENT

[S][A] 114.1 General. If ~~((during the inspection of))~~ a premises, a building or portion thereof, a structure or portion thereof, or any building system, vehicle or vessel, in whole or in part, ~~((constitutes a clear and inimical threat to human life, safety or health))~~ endangers any property or the health or safety of the occupants of the property or of neighboring premises, buildings, motor vehicles, vessels, or the health and safety of the public or fire department personnel, the fire code official shall issue such notice or orders to remove or remedy the conditions as shall be deemed necessary in accordance with this section. ~~((, and shall))~~ The fire code official may refer the building to the ~~((building official))~~ Seattle Department of Construction and Inspections for any repairs, alterations, remodeling, removing or demolition required.

[S][A] 114.1.1 Unsafe conditions. Structures, premises, vehicles, vessels or existing equipment that are or hereafter become unsafe, insanitary or deficient because of inadequate means of egress, inadequate light and ventilation, or that constitute a fire hazard, ~~((are otherwise dangerous to human life or the public welfare, or))~~ that involve illegal or improper occupancy or inadequate maintenance, or that are otherwise dangerous to human life or public welfare, shall be deemed an unsafe condition. Unsafe structures shall be taken down and removed or made safe, as the fire chief or fire code official deems necessary and as provided for in this section. A vacant structure that is not secured against unauthorized entry as required by Section 311 shall be deemed unsafe.

[S][A] 114.1.2 Structural hazards. Where an apparent structural hazard is caused by the faulty installation, operation or malfunction of any of the items or devices governed by this code, the fire code official ~~((shall))~~ is authorized to immediately notify the building code official in accordance with Section 114.1.

[S][A] 114.1.3 Public nuisance. A building or portion thereof, or premises, that is deemed unsafe under this section is found and declared to be a *public nuisance*. The *fire code official* is authorized to abate the *public nuisance*. The cost of such abatement shall be recovered from the *owner* or *person* responsible or both in any manner provided by law.

[S][A] 114.2 Evacuation. The *fire code official* or the fire department official in charge of an incident shall be authorized to order the immediate evacuation of any occupied premises, building or portion thereof, structure, vehicle, or vessel deemed unsafe where such premises, building or portion thereof, structure, vehicle, or vessel has hazardous conditions that pose an imminent danger to premises, building or portion thereof, structure, vehicle, or vessel occupants. Persons so notified shall immediately leave the structure or premises, vehicle, or vessel and shall not enter or re-enter until authorized to do so by the *fire code official* or the fire department official in charge of the incident.

[S] ((A) 114.3 Record. The *fire code official* shall cause a report to be filed on an unsafe condition. The report shall state the occupancy of the structure and the nature of the unsafe condition.

[A] 114.4 Notice. If an unsafe condition is found, the *fire code official* shall serve on the *owner* of the structure or the *owner's* authorized agent a written notice that describes the condition deemed unsafe and specifies the required repairs or improvements to be made to abate the unsafe condition, or requires the unsafe structure to be demolished within a stipulated time. Such notice shall require the person thus notified to declare immediately to the *fire code official* acceptance or rejection of the terms of the order.

[A] 114.5 Method of service. Such notice shall be deemed properly served where a copy thereof is served in accordance with one of the following methods:

1. A copy is delivered to the *owner* personally.
2. A copy is sent by certified or registered mail addressed to the *owner* at the last known address with return receipt requested.
3. A copy is delivered in any other manner as prescribed by local law.

If the certified or registered letter is returned showing that the letter was not delivered, a copy thereof shall be posted in a conspicuous place in or about the structure affected by such notice. Service of such notice in the foregoing manner on the *owner's* authorized agent shall constitute service of notice on the *owner*.)

[S][A] ((114.6)) 114.3 Restoration or abatement. The structure or equipment determined to be unsafe by the *fire code official* is permitted to be restored to a safe condition. The *owner*, the *owner's* authorized agent, operator or occupant of a structure, premises or equipment deemed unsafe by the *fire code official* shall abate or cause to be abated or corrected such unsafe conditions either by repair, rehabilitation, demolition or other *approved* corrective action. To the extent that repairs, *alterations* or additions are made or a change of occupancy occurs during the restoration of the structure, such repairs, *alterations*, additions or change of occupancy shall comply with the requirements of Section 105.1.5 and the *International Existing Building Code*. Where the *owner*, the *owner's* authorized agent, operator or occupant fails to abate or cause to be abated or corrected such unsafe conditions, the *fire code official* is authorized to abate such unsafe conditions that are in violation of the code. The cost of such abatement shall be recovered from the *owner* or *person* responsible or both in any manner provided by law.

[S][A] ((114.7)) 114.4 Summary abatement. Where conditions exist that are deemed ((*hazardous*)) an imminent danger to life and property, and issuing an order or notice that provides a compliance deadline is not practical, the *fire code official* or fire department official in charge of the incident is authorized to declare the conditions a public nuisance and abate summarily such hazardous conditions that are in violation of this code. Such summary abatement may include, but is not limited to, demolition. Only the Fire Chief, or the Assistant Chief serving as Fire Marshal, may abate summarily, or cause to be abated, via demolition. The cost of such abatement shall be recovered from the *owner* or *person* responsible or both in any manner provided by law, including through a special assessment under RCW 35.21.955 against the property filed as a lien with the King County Recorder.

[S] 114.5 Notification. The *fire code official* shall serve the responsible party with a copy of violations, correction letters, and orders issued.

The property owner shall be notified in the manner required by RCW 35.21.955 prior to the filing of a lien that the costs of abatement may be assessed against the property as authorized by RCW 35.21.955.

[S] 114.6 Abatement costs. Whenever abatement is performed as authorized in Section 114.3 or Section 114.4, the Fire Chief or the Fire Chief's designee is authorized to seek reimbursement for the actual costs of incurred services, including City labor costs, together with a charge equal to 15 percent of the City's actual incurred costs to cover administrative expenses. These charges shall be a cost of abatement and shall be collected from the owner in any manner provided by law, including through a special assessment under RCW 35.21.955 against the property filed as a lien with the King County Recorder. The property owner shall be notified in the manner required by RCW 35.21.955 prior to the filing of a lien that the costs of abatement and associated fees may be assessed against the property as authorized by RCW 35.21.955.

## SCOPE AND ADMINISTRATION

**[S] 114.7 Abatement protocols.** The Fire Department shall, in consultation with the Law Department and the Seattle Department of Construction and Inspections, develop operational protocols regarding the use of summary abatement authority. These protocols shall address practices necessary to ensure the proper application of summary abatement authority, including but not limited to: adequate documentation of conditions requiring summary abatement, and specific guidance on the use of demolition during a summary abatement.

**[S] 114.8 Abatement reporting.** The Department shall, by December 31 of each year beginning in 2024, provide to the City Council a report documenting the use of abatement and summary abatement authority, with the following information for the year: the number of abatement actions; the number of summary abatement actions, including the number of demolitions; all costs associated with each abatement or summary abatement action, and the status of attempted cost recovery for these actions; data on the geographic distribution of abatement and summary abatement actions; and the type of properties involved (e.g., residential or commercial).

## CHAPTER 2

# DEFINITIONS

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**User note:**

*About this chapter: Codes, by their very nature, are technical documents. Every word, term and punctuation mark can add to or change the meaning of a technical requirement. It is necessary to maintain a consensus on the specific meaning of each term contained in the code. Chapter 2 performs this function by stating clearly what specific terms mean for the purpose of the code.*

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### SECTION 201 GENERAL

**201.1 Scope.** Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this chapter.

**201.2 Interchangeability.** Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

**[S] 201.3 Terms defined in other codes.** Where terms are not defined in this code and are defined in the *International Building Code*, *International Fuel Gas Code*, *International Mechanical Code* or (~~*International*~~) *Uniform Plumbing Code*, such terms shall have the meanings ascribed to them as in those codes.

**201.4 Terms not defined.** Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies. *Merriam Webster's Collegiate Dictionary, 11th Edition*, shall be considered as providing ordinarily accepted meanings.

**[S] 201.5 References to other codes.** Whenever an International, National or Uniform Code is referenced in this code, it shall mean the Seattle edition of that code, including any local amendments. References to the "Building Code," "Fire Code," "Mechanical Code" and "Plumbing Code" mean the Seattle editions of those codes.

**[S] 201.6 Metric and English units.** Wherever in this code there is a conflict between metric units of measurements and English units, the English units govern.

### SECTION 202 GENERAL DEFINITIONS

**[BG] 24-HOUR BASIS.** The actual time that a person is an occupant within a facility for the purpose of receiving care. It shall not include a facility that is open for 24 hours and is capable of providing care to someone visiting the facility during any segment of the 24 hours.

**3D PRINTER.** A machine used in the additive manufacturing process for fabricating objects through the deposition of a material using a print head, nozzle or other printer technology.

**[M] ACCESS (TO).** That which enables a device, appliance or equipment to be reached by *ready access* or by a means that first requires the removal or movement of a panel or similar obstruction [see also "*Ready access (to)*"].

**[BE] ACCESSIBLE MEANS OF EGRESS.** A continuous and unobstructed way of egress travel from any *accessible* point in a building or facility to a *public way*.

**[BE] ACCESSIBLE ROUTE.** A continuous, unobstructed path that complies with Chapter 11 of the *International Building Code*.

**ACTIVE RF EMITTING DEVICE.** Any type of circuit component that requires an AC or DC power source with the ability to electrically control electron flow and/or amplification of RF signal, including but not limited to signal boosters, repeaters, bidirectional amplifiers and fiber-distributed antenna systems.

**[S] ADDITION.** An extension or increase in floor area, number of stories, or height of a building or structure.

**ADDITIVE MANUFACTURING.** A process of joining materials to make objects from 3D model data, usually layer upon layer, sometimes referred to as 3D printing. This code recognizes two types of additive manufacturing:

**Industrial additive manufacturing.** 3D printing operations that typically utilize combustible powders or metals, an inert gas supply, a *combustible dust* collection system, or that create a hazardous (classified) location area or zone outside the equipment.

## DEFINITIONS

**Nonindustrial additive manufacturing.** 3D printing operations that do create a hazardous (classified) location area outside the equipment and do not utilize an inert gas supply or a *combustible dust* collection system.

**[W] ADULT FAMILY HOME.** A dwelling, licensed by the state of Washington department of social and health services, in which a person or persons provide personal care, special care, room and board to more than one but not more than six adults who are not related by blood or marriage to the person or persons providing the services. An existing adult family home may provide services to up to eight adults upon approval from the department of social and health services under RCW 70.128.066 and in accordance with Section 903.

**AEROSOL CONTAINER.** A metal can or plastic container up to a maximum size of 33.8 fluid ounces (1000 ml) or a glass bottle up to a maximum size of 4 fluid ounces (118 ml) designed and intended to dispense an aerosol.

**AEROSOL COOKING SPRAY PRODUCTS.** Aerosol cooking spray products are those aerosol products designed to deliver a vegetable oil or a solid or nonflammable liquid to reduce sticking on cooking and baking surfaces, or to be applied to food, or both. These products have a chemical heat of combustion that is greater than 8600 Btu/lb. (20 kJ/g) and contain no more than 18 percent by weight of flammable propellant.

**AEROSOL PRODUCT.** A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level 1, Level 2 or Level 3.

**Level 1 aerosol products.** Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g).

**Level 2 aerosol products.** Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g), but less than or equal to 13,000 Btu/lb (30 kJ/g).

**Level 3 aerosol products.** Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).

**AEROSOL PRODUCT WAREHOUSE.** A building used for warehousing aerosol products.

**AGENCY.** Any emergency responder department within the jurisdiction that utilizes radio frequencies for communication. This could include, but not be limited to, various public safety agencies such as fire departments, emergency medical services and law enforcement.

**AGENT.** A person who shall have charge, care or control of any structure as *owner*, or agent of the *owner*, or as executor, executrix, administrator, administratrix, trustee or guardian of the estate of the *owner*. Any such person representing the actual *owner* shall be bound to comply with the provisions of this code to the same extent as if that person was the *owner*.

**[BG] AGRICULTURAL BUILDING.** A structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products. This structure shall not be a place of human habitation or a place of employment where agricultural products are processed, treated or packaged, nor shall it be a place used by the public.

**AGRO-INDUSTRIAL.** A facility, or portion thereof, housing operations involving the transforming of raw agricultural products into intermediate or consumable products.

**AIRCRAFT MOTOR-VEHICLE FUEL-DISPENSING FACILITY.** That portion of property where *flammable* or *combustible liquids* or gases used as motor fuels are stored and dispensed from fixed automotive-type equipment into the fuel tanks of aircraft.

**AIRCRAFT OPERATION AREA (AOA).** Any area used or intended for use for the parking, taxiing, takeoff, landing or other ground-based aircraft activity.

**[BG] AIR-INFLATED STRUCTURE.** A structure that uses air-pressurized membrane beams, arches or other elements to enclose space. Occupants of such a structure do not occupy the pressurized areas used to support the structure.

**AIRPORT.** An area of land or structural surface that is used, or intended for use, for the landing and taking off of aircraft with an overall length greater than 39 feet (11 887 mm) and an overall exterior fuselage width greater than 6.6 feet (2012 mm), and any appurtenant areas that are used or intended for use for airport buildings and other airport facilities.

**[BG] AIR-SUPPORTED STRUCTURE.** A structure wherein the shape of the structure is attained by air pressure, and occupants of the structure are within the elevated pressure area. Air supported structures are of two basic types:

**Double skin.** Similar to a single skin, but with an attached liner that is separated from the outer skin and provides an airspace which serves for insulation, acoustic, aesthetic or similar purposes.

**Single skin.** Where there is only the single outer skin and the air pressure is directly against that skin.

**[BE] AISLE.** An unenclosed *exit access* component that defines and provides a path of egress travel.

**[BE] AISLE ACCESSWAY.** That portion of an *exit access* that leads to an *aisle*.

**ALARM, NUISANCE.** See “*Nuisance alarm*.”

**[S] ALARM, PREVENTABLE FIRE.** See “*Preventable fire alarm*.”

**ALARM DEVICE, MULTIPLE STATION.** See “*Multiple-station alarm device*.”

**ALARM NOTIFICATION APPLIANCE.** A fire alarm system component such as a bell, horn, speaker, light or text display that provides audible, tactile or visible outputs, or any combination thereof. See also “*Audible alarm notification appliance*” or “*Visible alarm notification appliance*.”

**ALARM SIGNAL.** A signal indicating an emergency requiring immediate action, such as a signal indicative of fire.

**ALARM VERIFICATION FEATURE.** A feature of automatic fire detection and alarm systems to reduce unwanted alarms wherein smoke detectors report alarm conditions for a minimum period of time, or confirm alarm conditions within a given time period, after being automatically reset, in order to be accepted as a valid alarm-initiation signal.

**ALCOHOL-BASED HAND RUB.** An alcohol-containing preparation designed for application to the hands for reducing the number of viable microorganisms on the hands and containing ethanol or isopropanol in an amount not exceeding 95-percent by volume.

**ALCOHOL-BLENDED FUELS.** *Flammable* liquids consisting of greater than 10 percent, by volume, ethanol or other alcohols blended with gasoline.

**[W] ALERT SIGNAL.** A distinctive signal indicating the need for trained personnel and occupants to initiate a specific action, such as shelter-in-place.

**[W] ALERT SYSTEM.** Approved devices, equipment, and systems or combinations of systems used to transmit or broadcast an alert signal.

**[A] ALTERATION.** Any construction or renovation to an existing structure other than a repair or addition.

**[BE] ALTERNATING TREAD DEVICE.** A device that has a series of steps between 50 and 70 degrees (0.87 and 1.22 rad) from horizontal, usually attached to a center support rail in an alternating manner so that the user does not have both feet on the same level at the same time.

**[BG] AMBULATORY CARE FACILITY.** Buildings or portions thereof used to provide medical, surgical, psychiatric, nursing or similar care on a less-than-24-hour basis to persons who are rendered *incapable of self-preservation* by the services provided or staff has accepted responsibility for care recipients already incapable.

**AMMONIUM NITRATE.** A chemical compound represented by the formula  $NH_4NO_3$ .

**ANNUNCIATOR.** A unit containing one or more indicator lamps, alphanumeric displays or other equivalent means in which each indication provides status information about a circuit, condition or location.

**[A] APPROVED.** Acceptable to the *fire code official*.

**[BG] AREA, BUILDING.** The area included within surrounding *exterior walls* (or *exterior walls* and *fire walls*) exclusive of vent shafts and *courts*. Areas of the building not provided with surrounding walls shall be included in the building area if such areas are included within the horizontal projection of the roof or floor above.

**[BE] AREA OF REFUGE.** An area where persons unable to use *stairways* can remain temporarily to await instructions or assistance during emergency evacuation.

**ARRAY.** The configuration of storage. Characteristics considered in defining an array include the type of packaging, flue spaces, height of storage and compactness of storage.

**ARRAY, CLOSED.** A storage configuration having a 6-inch (152 mm) or smaller width vertical flue space that restricts air movement through the stored commodity.

**[W] ASSISTED LIVING FACILITY.** A home or other institution, licensed by the state of Washington, providing housing, basic services and assuming general responsibility for the safety and well-being of residents under chapter 18.20 RCW and chapter 388-78A WAC. These facilities may provide care to residents with symptoms consistent with dementia requiring additional security measures.

**[BG] ATRIUM.** An opening connecting two or more stories other than enclosed *stairways*, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or other equipment, which is closed at the top and not defined as a mall. Stories, as used in this definition, do not include balconies within assembly groups or mezzanines that comply with Section 505 of the *International Building Code*.

**[BG] ATTIC.** The space between the ceiling framing of the top *story* and the underside of the roof.

**AUDIBLE ALARM NOTIFICATION APPLIANCE.** A notification appliance that alerts by the sense of hearing.

**AUTOMATED RACK STORAGE.** Automated rack storage is a stocking method whereby the movement of pallets, products, apparatus or systems are automatically controlled by mechanical or electronic devices.

**AUTOMATIC.** As applied to fire protection devices, a device or system providing an emergency function without the necessity for human intervention and activated as a result of a predetermined temperature rise, rate of temperature rise or combustion products.

## DEFINITIONS

**AUTOMATIC FIRE-EXTINGUISHING SYSTEM.** An *approved* system of devices and equipment which automatically detects a fire and discharges an *approved* fire-extinguishing agent onto or in the area of a fire.

**AUTOMATIC SMOKE DETECTION SYSTEM.** A fire alarm system that has initiation devices that utilize smoke detectors for protection of an area such as a room or space with detectors to provide early warning of fire.

**AUTOMATIC SPRINKLER SYSTEM.** An *automatic sprinkler system*, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The system includes a suitable water supply. The portion of the system above the ground is a network of specially sized or hydraulically designed piping installed in a structure or area, generally overhead, and to which automatic sprinklers are connected in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the fire area.

**AUTOMATIC WATER MIST SYSTEM.** A system consisting of a water supply, a pressure source and a distribution piping system with attached nozzles which, at or above a minimum operating pressure, defined by its listing, discharges water in fine droplets meeting the requirements of NFPA 750 for the purpose of the control, suppression or extinguishment of a fire. Such systems include wet-pipe, dry-pipe and pre-action types. The systems are designed as engineered, preengineered, local-application or total flooding systems.

**AUTOMOTIVE MOTOR FUEL-DISPENSING FACILITY.** That portion of property where *flammable* or *combustible liquids* or gases used as motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles.

**AVERAGE AMBIENT SOUND LEVEL.** The root mean square, A-weighted sound pressure level measured over a 24-hour period, or the time any person is present, whichever time period is less.

**[S][BG] AWNING.** ~~((An architectural projection that provides weather protection, identity or decoration and is partially or wholly supported by the building to which it is attached. An awning is comprised of a lightweight frame structure over which a covering is attached.))~~ A protective covering with a nonrigid surface projecting from a building.

**[BE] BALANCED DOOR.** A door equipped with double-pivoted hardware so designed as to cause a semicounter balanced swing action when opening.

**BALED COTTON.** See “*Cotton*.”

**BALED COTTON, DENSELY PACKED.** See “*Cotton*.”

**BARRICADE.** A structure that consists of a combination of walls, floor and roof, which is designed to withstand the rapid release of energy in an explosion and which is fully confined, partially vented or fully vented; or other effective method of shielding from *explosive materials* by a natural or artificial barrier.

**Artificial barricade.** An artificial mound or revetment with a minimum thickness of 3 feet (914 mm).

**Natural barricade.** Natural features of the ground, such as hills, or timber of sufficient density that the surrounding exposures that require protection cannot be seen from the magazine or building containing *explosives* when the trees are bare of leaves.

**BARRICADED.** The effective screening of a building containing *explosive materials* from the magazine or other building, railway or highway by a natural or an artificial barrier. A straight line from the top of any sidewall of the building containing *explosive materials* to the eave line of any magazine or other building or to a point 12 feet (3658 mm) above the center of a railway or highway shall pass through such barrier.

**[BG] BASEMENT.** A story that is not a story above *grade plane*.

**BATTERY SYSTEM, STATIONARY STORAGE.** A rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls and associated electrical equipment designed to provide electrical power to a building. The system is typically used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities.

**BATTERY TYPES.** For the purposes of this code, certain types are defined as follows:

**Flow battery.** A type of storage battery that includes chemical components dissolved in two different liquids. Ion exchange, which provides the flow of electrical current, occurs through the membrane while both liquids circulate in their respective spaces.

**Lead-acid battery.** A storage battery that is comprised of lead electrodes immersed in a solution of water and sulphuric acid electrolyte.

**Lithium metal polymer battery.** A storage battery that is similar to the lithium ion battery except that it has a lithium metal anode in the place of the traditional carbon or graphite anode.

**Lithium-ion battery.** A storage battery with lithium ions serving as the charge carriers of the battery. The electrolyte is a polymer mixture of carbonates with an inorganic salt and can be in a liquid or a gelled polymer form. Lithiated metal oxide is typically a cathode and forms of carbon or graphite typically form the anode.



**Nickel-cadmium (Ni-Cd) battery.** An alkaline storage battery in which the positive active material is nickel oxide, the negative electrode contains cadmium and the electrolyte is a solution of water and potassium hydroxide.

**Nickel-metal hydride (Ni-MH).** An alkaline storage battery in which the positive active material is nickel oxide, the negative electrode is an intermetallic compound and the electrolyte is usually potassium hydroxide.

**Stationary storage battery.** A group of electrochemical cells interconnected to supply a nominal voltage of DC power to a suitably connected electrical load, designed for service in a permanent location.

**[S] BERTH.** The water space to be occupied by a boat or other vessel alongside or between bulkheads, piers, piles, fixed and floating docks, or any similar access structure.

**BIN BOX.** A five-sided container with the open side facing an aisle. Bin boxes are self-supporting or supported by a structure designed so that little or no horizontal or vertical space exists around the boxes.

**BIOMASS.** Plant- or animal-based material of biological origin excluding material embedded in geologic formations or transformed into fossils.

**BLAST AREA.** The area including the blast site and the immediate adjacent area within the influence of flying rock, missiles and concussion.

**BLAST SITE.** The area in which *explosive materials* are being or have been loaded and which includes all holes loaded or to be loaded for the same blast and a distance of 50 feet (15 240 mm) in all directions.

**BLASTER.** A person qualified in accordance with Section 5601.4 to be in charge of and responsible for the loading and firing of a blast.

**BLASTING AGENT.** A material or mixture consisting of fuel and oxidizer, intended for blasting provided that the finished product, as mixed for use or shipment, cannot be detonated by means of a No. 8 test detonator when unconfined. Blasting agents are labeled and placarded as Class 1.5 material by US DOTn.

**[BE] BLEACHERS.** Tiered seating supported on a dedicated structural system and two or more rows high and is not a building element (see “*Grandstand*”).

**[BG] BOARDING HOUSE.** A building arranged or used for lodging for compensation, with or without meals, and not occupied as a single-family unit.

**[S] BOAT.** Any device in which a person may be transported upon water and includes every motorboat, sailboat, pontoon boat, rowboat, skiff, dinghy, or canoe, regardless of size.

**[S] BOATHOUSE.** An independently floating structure designed to be moored to a main float system to enclose and protect a vessel or vessels. A boathouse is capable of being moved on water, but is typically moored to a float system for long periods of time.

**[S] BOATYARD.** A facility used for constructing, repairing, servicing, hauling from the water, storing (on land and in water), and launching of boats. Boatyards are usually, but not necessarily, waterfront facilities. Boatyards provide facilities and services, as described in the definition, that exceed the basic berthing or mooring of boats.

**BOILING POINT.** The temperature at which the vapor pressure of a liquid equals the atmospheric pressure of 14.7 pounds per square inch absolute (psia) (101 kPa) or 760 mm of mercury. Where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, for the purposes of this classification, the 20-percent evaporated point of a distillation performed in accordance with ASTM D86 shall be used as the boiling point of the liquid.

**[S] BONFIRE.** An outdoor fire utilized for ceremonial or recreational purposes and exceeding the size of a recreational fire.

**[BE] BREAKOUT.** For revolving doors, a process whereby wings or door panels can be pushed open manually for *means of egress* travel.

**BRITISH THERMAL UNIT (BTU).** The heat necessary to raise the temperature of 1 pound (0.454 kg) of water by 1°F (0.5565°C).

**[A] BUILDING.** Any structure utilized or intended for supporting or sheltering any occupancy.

**BUILDING AREA.** See “*Area, building.*”

**BUILDING HEIGHT.** See “*Height, building.*”

**[S][A] BUILDING OFFICIAL.** The ~~((officer or other designated authority charged with the administration and enforcement of the *International Building Code*))~~ Director of the Seattle Department of Construction and Inspections, or a duly authorized representative.

## DEFINITIONS

**BULK OXYGEN SYSTEM.** An assembly of equipment, such as oxygen storage containers, pressure regulators, safety devices, vaporizers, manifolds and interconnecting piping, that has a storage capacity of more than 20,000 cubic feet (566 m<sup>3</sup>) of oxygen at *normal temperature and pressure (NTP)* including unconnected reserves on hand at the site. The bulk oxygen system terminates at the point where oxygen at service pressure first enters the supply line. The oxygen containers can be stationary or movable, and the oxygen can be stored as a gas or liquid.

**BULK PLANT OR TERMINAL.** That portion of a property where *flammable* or *combustible liquids* are received by tank vessel, pipelines, tank car or tank vehicle and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipeline, tank car, tank vehicle, portable tank or container.

**BULK TRANSFER.** The loading or unloading of *flammable* or *combustible liquids* from or between tank vehicles, tank cars or storage tanks.

**BULLET RESISTANT.** Constructed so as to resist penetration of a bullet of 150-grain M2 ball ammunition having a nominal muzzle velocity of 2,700 feet per second (fps) (824 mps) when fired from a 30-caliber rifle at a distance of 100 feet (30 480 mm), measured perpendicular to the target.

**BUSINESS DAY.** A day that is not a Saturday, Sunday, or federal, state, or City holiday.

~~[S] CANOPY. ((A structure or architectural projection of rigid construction over which a covering is attached that provides weather protection, identity or decoration, and may be structurally independent or supported by attachment to a building on one end and by not less than one stanchion on the other end.))~~ **A protective covering with a rigid surface projecting from a building. Marquees are a type of canopy.**

➔ **CAPACITOR ENERGY STORAGE SYSTEM.** A stationary, rechargeable energy storage system consisting of capacitors, chargers, controls and associated electrical equipment designed to provide electrical power to a building or facility. The system is typically used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities.

➔ **CARBON DIOXIDE ENRICHMENT SYSTEM.** A system where carbon dioxide gas is intentionally introduced into an indoor environment, typically for the purpose of stimulating plant growth.

**CARBON DIOXIDE EXTINGUISHING SYSTEM.** A system supplying carbon dioxide (CO<sub>2</sub>) from a pressurized vessel through fixed pipes and nozzles. The system includes a manual- or automatic-actuating mechanism.

**CARBON MONOXIDE ALARM.** A single- or multiple-station alarm intended to detect carbon monoxide gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components and an alarm notification appliance in a single unit.

**CARBON MONOXIDE DETECTOR.** A device with an integral sensor to detect carbon monoxide gas and transmit an alarm signal to a connected alarm control unit.

**[BG] CARE SUITE.** In Group I-2 occupancies, a group of treatment rooms, care recipient sleeping rooms and the support rooms or spaces and circulation space within the suite where staff are in attendance for supervision of all care recipients within the suite, and the suite is in compliance with the requirements of Section 407.4.4 of the *International Building Code*.

**CARTON.** A cardboard or fiberboard box enclosing a product.

**CEILING LIMIT.** The maximum concentration of an airborne contaminant to which one may be exposed. The ceiling limits utilized are those published in DOL 29 CFR Part 1910.1000. The ceiling Recommended Exposure Limit (REL-C) concentrations published by the US National Institute for Occupational Safety and Health (NIOSH), Threshold Limit Value-Ceiling (TLV-C) concentrations published by the American Conference of Governmental Industrial Hygienists (ACGIH), Ceiling Workplace Environmental Exposure Level (WEEL-Ceiling) Guides published by the American Industrial Hygiene Association (AIHA), and other *approved*, consistent measures are allowed as surrogates for hazardous substances not listed in DOL 29 CFR Part 1910.1000.

~~[A] CHANGE OF OCCUPANCY. ((Either of the following shall be considered as a change of occupancy where this code requires a greater degree of safety, accessibility, structural strength, fire protection, means of egress, ventilation or sanitation than is existing in the current building or structure:~~

- ~~1. Any change in the occupancy classification of a building or structure.~~
- ~~2. Any change in the purpose of, or a change in the level of activity within, a building or structure.))~~

A change in the use of a building or a portion of a building that results in one of the following:

1. A change of occupancy classification.
2. A change from one group to another group within an occupancy classification.
3. Any change in use within a group for a specific occupancy classification.

➔ **CHEMICAL.** An element, chemical compound or mixture of elements or compounds or both.

**CHEMICAL FUME HOOD.** A ventilated enclosure designed to contain and exhaust fumes, gases, vapors, mists and particulate matter generated within the hood.

**CHEMICAL NAME.** The scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry, the Chemical Abstracts Service rules of nomenclature, or a name which will clearly identify a chemical for the purpose of conducting an evaluation.

**[W] CHILD CARE.** For the purposes of these regulations, child care is the care of children during any period of a 24-hour day.

**[W] CHILD CARE, FAMILY HOME.** A child care facility, licensed by Washington State, located in a dwelling of the person or persons under whose direct care and supervision the child is placed, for the care of 12 or fewer children, including children who reside at the home.

**[M] CHIMNEY.** A primarily vertical structure containing one or more flues for the purpose of carrying gaseous products of combustion and air from a fuel-burning appliance to the outdoor atmosphere.

**Factory-built chimney.** A *listed* and *labeled* chimney composed of factory-made components, assembled in the field in accordance with manufacturer's instructions and the conditions of the listing.

**Masonry chimney.** A field-constructed chimney composed of solid masonry units, bricks, stones, or concrete.

**Metal chimney.** A field-constructed chimney of metal.

**CLEAN AGENT.** Electrically nonconducting, volatile or gaseous fire extinguishant that does not leave a residue upon evaporation.

**[BG] CLINIC, OUTPATIENT.** Buildings or portions thereof used to provide medical care on a less-than-24-hour basis to persons who are not rendered incapable of self-preservation by the services provided.

**CLOSED CONTAINER.** A container sealed by means of a lid or other device such that liquid, vapor or dusts will not escape from it under ordinary conditions of use or handling.

**CLOSED SYSTEM.** The use of a solid or liquid hazardous material involving a closed vessel or system that remains closed during normal operations where vapors emitted by the product are not liberated outside of the vessel or system and the product is not exposed to the atmosphere during normal operations; and all uses of *compressed gases*. Examples of closed systems for solids and liquids include product conveyed through a piping system into a closed vessel, system or piece of equipment.

**[W] CLUSTER.** Clusters are multiple *portable school classrooms* separated by less than the requirements of the building code for separate buildings.

**COLD DECK.** A pile of unfinished cut logs.

**COMBUSTIBLE DUST.** Finely divided solid material which is 420 microns or less in diameter and which, when dispersed in air in the proper proportions, could be ignited by a flame, spark or other source of ignition. Combustible dust will pass through a US No. 40 standard sieve.

**COMBUSTIBLE FIBERS.** Readily ignitable and free-burning materials in a fibrous or shredded form, such as cocoa fiber, cloth, cotton, excelsior, hay, hemp, henequen, istle, jute, kapok, oakum, rags, sisal, Spanish moss, straw, tow, wastepaper, certain synthetic fibers or other like materials. This definition does not include densely packed baled cotton.

**COMBUSTIBLE GAS DETECTOR.** An instrument that samples the local atmosphere and indicates the presence of ignitable vapors or gases within the flammable or explosive range expressed as a volume percent in air.

**COMBUSTIBLE LIQUID.** A liquid having a closed cup *flash point* at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:

The category of combustible liquids does not include *compressed gases* or *cryogenic fluids* or liquids that do not have a fire point when tested in accordance with ASTM D92.

**Class II.** Liquids having a closed cup *flash point* at or above 100°F (38°C) and below 140°F (60°C).

**Class IIIA.** Liquids having a closed cup *flash point* at or above 140°F (60°C) and below 200°F (93°C).

**Class IIIB.** Liquids having closed cup *flash points* at or above 200°F (93°C).

**[M] COMMERCIAL COOKING APPLIANCES.** Appliances used in a commercial food service establishment for heating or cooking food. For the purpose of this definition, a commercial food service establishment is where food is prepared for sale or is prepared on a scale that is by volume and frequency not representative of domestic household cooking.

**COMMERCIAL MOTOR VEHICLE.** A motor vehicle used to transport passengers or property where the motor vehicle:

1. Has a gross vehicle weight rating of 10,000 pounds (454 kg) or more; or
2. Is designed to transport 16 or more passengers, including the driver.

**COMMODITY.** A combination of products, packing materials and containers.

## DEFINITIONS

**[BE] COMMON PATH OF EGRESS TRAVEL.** That portion of *exit access* travel distance measured from the most remote point of each room, area or space to that point where the occupants have separate and distinct access to two *exits* or *exit access* doorways.

**[BE] COMMON USE.** Interior or exterior circulation paths, rooms, spaces or elements that are not for public use and are made available for the shared use of two or more people.

**COMPRESSED GAS.** A material, or mixture of materials that:

1. Is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure; and
2. Has a *boiling point* of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied or in solution, except those gases which have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C).

The states of a compressed gas are categorized as follows:

1. Nonliquefied compressed gases are gases, other than those in solution, which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C).
2. Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C).
3. Compressed gases in solution are nonliquefied gases that are dissolved in a solvent.
4. Compressed gas mixtures consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.

**COMPRESSED GAS CONTAINER.** A pressure vessel designed to hold *compressed gases* at pressures greater than one atmosphere at 68°F (20°C) and includes cylinders, containers and tanks.

**COMPRESSED GAS SYSTEM.** An assembly of equipment designed to contain, distribute or transport *compressed gases*. It can consist of a *compressed gas* container or containers, reactors and appurtenances, including pumps, compressors and connecting piping and tubing.

**[BG] CONGREGATE LIVING FACILITIES.** A building or part thereof that contains *sleeping units* where residents share bathroom and/or kitchen facilities.

**CONSTANTLY ATTENDED LOCATION.** A designated location at a facility staffed by trained personnel on a continuous basis where alarm or supervisory signals are monitored and facilities are provided for notification of the fire department or other emergency services.

**[S][A] CONSTRUCTION DOCUMENTS.** The written, graphic and pictorial documents in electronic or paper format prepared or assembled for describing the design, location and physical characteristics of the elements of the project necessary for obtaining a permit and final approval of construction.

**CONTAINER.** A vessel of 60 gallons (227 L) or less in capacity used for transporting or storing hazardous materials. Pipes, piping systems, engines and engine fuel tanks are not considered to be containers.

**[S] CONTAINER FREIGHT STATION.** A transload facility used primarily for loading and unloading cargo from containers.

**CONTAINMENT SYSTEM.** A gastight recovery system comprised of equipment or devices which can be placed over a leak in a *compressed gas* container, thereby stopping or controlling the escape of gas from the leaking container.

**CONTAINMENT VESSEL.** A gastight recovery vessel designed so that a leaking *compressed gas* container can be placed within its confines thereby encapsulating the leaking container.

**CONTROL AREA.** Spaces within a building where quantities of hazardous materials not exceeding the *maximum allowable quantities per control area* are stored, dispensed, used or handled. See also the definition of “*Outdoor control area*.”

**[BE] CORRIDOR.** An enclosed *exit access* component that defines and provides a path of egress travel.

**CORRIDOR, OPEN-ENDED.** See “*Open-ended corridor*.”

**CORROSIVE.** A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.

**COTTON.**

**Baled cotton.** A natural seed fiber wrapped in and secured with industry-accepted materials, usually consisting of burlap, woven polypropylene, polyethylene or cotton or sheet polyethylene, and secured with steel, synthetic or wire bands, or wire; also includes linters (lint removed from the cottonseed) and motes (residual materials from the ginning process).

**Baled cotton, densely packed.** Cotton, made into banded bales, with a packing density of not less than 22 pounds per cubic foot (360 kg/m<sup>3</sup>), and dimensions complying with the following: a length of 55 inches (1397 mm), a width of 21 inches (533.4 mm) and a height of 27.6 to 35.4 inches (701 to 899 mm).

**Seed cotton.** Perishable raw agricultural commodity consisting of cotton fiber (lint) attached to the seed of the cotton plant, which requires ginning to become a commercial product.

**[BG] COURT.** An open, uncovered space, unobstructed to the sky, bounded on three or more sides by exterior building walls or other enclosing devices.

**[W] COVERED BOAT MOORAGE.** A pier or system of floating or fixed access ways to which vessels on water may be secured and any portion of which are covered by a roof.

**[BG] COVERED MALL BUILDING.** A single building enclosing a number of tenants and occupants such as retail stores, drinking and dining establishments, entertainment and amusement facilities, passenger transportation terminals, offices, and other similar uses wherein two or more tenants have a main entrance into one or more malls. Anchor buildings shall not be considered as a part of the covered mall building. The term “covered mall building” shall include open mall buildings as defined below.

**Mall.** A roofed or covered common pedestrian area within a covered mall building that serves as access for two or more tenants and not to exceed three levels that are open to each other. The term “mall” shall include open malls as defined below.

**Open mall.** An unroofed common pedestrian way serving a number of tenants not exceeding three levels. Circulation at levels above grade shall be permitted to include open exterior balconies leading to *exits* discharging at grade.

**Open mall building.** Several structures housing a number of tenants such as retail stores, drinking and dining establishments, entertainment and amusement facilities, offices, and other similar uses wherein two or more tenants have a main entrance into one or more open malls. Anchor buildings are not considered as a part of the open mall building.

**CRITICAL AREAS.** Areas that are designated for the highest level of emergency responder radio coverage including but not limited to areas such as exit stairs, *exit passageways*, elevator lobbies, fire protection equipment room and control valve locations, and *fire command centers*.

**CRITICAL CIRCUIT.** A circuit that requires continuous operation to ensure safety of the structure and occupants.

**CRYOGENIC CONTAINER.** A cryogenic vessel of any size used for the transportation, handling or storage of *cryogenic fluids*.

**CRYOGENIC FLUID.** A fluid having a *boiling point* lower than -130°F (-89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa).

**CRYOGENIC VESSEL.** A pressure vessel, low-pressure tank or atmospheric tank designed to contain a *cryogenic fluid* on which venting, insulation, refrigeration or a combination of these is used in order to maintain the operating pressure within the design pressure and the contents in a liquid phase.

**CURRENT TAP.** An electrical device that, where connected to a permanently installed receptacle outlet, provides multiple receptacle outlet configurations.

**[W][BG] CUSTODIAL CARE.** Assistance with day-to-day living tasks; such as assistance with cooking, taking medication, bathing, using toilet facilities and other tasks of daily living. Custodial care includes persons receiving care who have the ability to respond to emergency situations and may receive limited verbal or physical assistance. ~~(and)~~ These care recipients may evacuate at a slower rate and/or who have mental and psychiatric complications.

**CYLINDER.** A pressure vessel designed for pressures higher than 40 psia (275.6 kPa) and having a circular cross section. It does not include a portable tank, multiunit tank car tank, cargo tank or tank car.

**DAMPER.** See “*Fire damper*” and “*Smoke damper*.”

**DAY BOX.** A portable magazine designed to hold *explosive materials* and constructed in accordance with the requirements for a Type 3 magazine as defined and classified in Chapter 56.

**DECORATIVE MATERIALS.** All materials applied over the building interior finish for decorative, acoustical or other effect including, but not limited to, curtains, draperies, fabrics, streamers and all other materials utilized for decorative effect including, but not limited to, bulletin boards, artwork, posters, photographs, paintings, batting, cloth, cotton, hay, stalks, straw, vines, leaves, trees, moss and similar items, foam plastics and materials containing foam plastics. Decorative materials do not include wall coverings, ceiling coverings, floor coverings, ordinary window shades, interior finish and materials 0.025 inch (0.64 mm) or less in thickness applied directly to and adhering tightly to a substrate.

**DEFLAGRATION.** An exothermic reaction, such as the extremely rapid oxidation of a flammable dust or vapor in air, in which the reaction progresses through the unburned material at a rate less than the velocity of sound. A deflagration can have an explosive effect.

## DEFINITIONS

**DELIVERED AUDIO QUALITY (DAQ).** A measure of audio quality over a transmission medium. This metric is often used to quantify the quality of audio heard over a radio system. DAQ levels are defined by the following scale:

DAQ 1 = unusable. Speech is present but not understandable.

DAQ 2 = speech is understandable with considerable effort. Requires frequent repetition due to noise or distortion.

DAQ 3 = speech understandable with slight effort. Requires occasional repetition due to noise or distortion.

DAQ 3.4 = speech understandable without repetition. Some noise or distortion present.

DAQ 4 = speech easily understandable. Little noise or distortion.

DAQ 5 = perfect. No distortion or noise discernible.

**DELUGE SYSTEM.** A sprinkler system employing open sprinklers attached to a piping system connected to a water supply through a valve that is opened by the operation of a detection system installed in the same area as the sprinklers. When this valve opens, water flows into the piping system and discharges from all sprinklers attached thereto.

**DESIGN PRESSURE.** The maximum gauge pressure that a pressure vessel, device, component or system is designed to withstand safely under the temperature and conditions of use expected.

**[S] DESIGNATED HOT WORK FACILITY.** Those piers, designated by the fire code official, and by virtue of their construction, location, fire protection, emergency vehicle access and fire hydrant availability, that are suitable to permit certain repairs to vessels.

**DESOLVENTIZING.** The act of removing a solvent from a material.

**DETACHED BUILDING.** A separate single-story building, without a *basement* or crawl space, used for the storage or use of hazardous materials and located an *approved* distance from all structures.

**DETEARING.** A process for rapidly removing excess wet coating material from a dipped or coated object or material by passing it through an electrostatic field.

**DETECTOR, HEAT.** A fire detector that senses heat, either abnormally high temperature or rate of rise, or both.

**DETONATING CORD.** A flexible cord containing a center core of high *explosive* used to initiate other *explosives*.

**DETONATION.** An exothermic reaction characterized by the presence of a shock wave in the material which establishes and maintains the reaction. The reaction zone progresses through the material at a rate greater than the velocity of sound. The principal heating mechanism is one of shock compression. *Detonations* have an *explosive* effect.

**DETONATOR.** A device containing any initiating or primary *explosive* that is used for initiating *detonation*. A detonator shall not contain more than 154.32 grains (10 grams) of total *explosives* by weight, excluding ignition or delay charges. The term includes, but is not limited to, electric blasting caps of instantaneous and delay types, blasting caps for use with safety fuses, detonating cord delay connectors, and noninstantaneous and delay blasting caps which use detonating cord, shock tube or any other replacement for electric leg wires. All types of detonators in strengths through No. 8 cap should be rated at 1-1/2 pounds (0.68 kg) of explosives per 1,000 caps. For strengths higher than No. 8 cap, consult the manufacturer.

**[BG] DETOXIFICATION FACILITIES.** Facilities that provide treatment for substance abuse serving care recipients who are incapable of self-preservation or who are harmful to themselves or others.

**DIP TANK.** A tank, vat or container of *flammable* or *combustible liquid* in which articles or materials are immersed for the purpose of coating, finishing, treating and similar processes.

**DISCHARGE SITE.** The immediate area surrounding the fireworks mortars used for an outdoor fireworks display.

**DISPENSING.** The pouring or transferring of any material from a container, tank or similar vessel, whereby vapors, dusts, fumes, mists or gases are liberated to the atmosphere.

**DISPENSING DEVICE, OVERHEAD TYPE.** A dispensing device that consists of one or more individual units intended for installation in conjunction with each other, mounted above a dispensing area typically within the motor fuel-dispensing facility canopy structure, and characterized by the use of an overhead hose reel.

**DISPLAY SITE.** The immediate area where a fireworks display is conducted. The display area includes the discharge site, the fallout area and the required separation distance from the mortars to spectator viewing areas. The display area does not include spectator viewing areas or vehicle parking areas.

**DOOR, BALANCED.** See “*Balanced door.*”

**DOOR, DUTCH.** See “*Dutch door.*”

**DOOR, LOW ENERGY POWER-OPERATED.** See “*Low energy power-operated door.*”

**DOOR, POWER-ASSISTED.** See “*Power-assisted door.*”

**DOOR, POWER-OPERATED.** See “*Power-operated door.*”

**DOORWAY, EXIT ACCESS.** See “*Exit access doorway.*”

**[BG] DORMITORY.** A space in a building where group sleeping accommodations are provided in one room, or in a series of closely associated rooms, for persons not members of the same family group, under joint occupancy and single management, as in college dormitories or fraternity houses.

**DRAFT CURTAIN.** A structure arranged to limit the spread of smoke and heat along the underside of the ceiling or roof.

**[BF] DRAFTSTOP.** A material, device or construction installed to restrict the movement of air within open spaces of concealed areas of building components such as crawl spaces, floor/ceiling assemblies, roof/ceiling assemblies and attics.

**DRY CLEANING.** The process of removing dirt, grease, paints and other stains from such items as wearing apparel, textiles, fabrics and rugs by use of nonaqueous liquids (solvents).

**DRY CLEANING PLANT.** A facility in which dry cleaning and associated operations are conducted, including the office, receiving area and storage rooms.

**DRY CLEANING ROOM.** An occupiable space within a building used for performing dry cleaning operations, the installation of solvent-handling equipment or the storage of dry cleaning solvents.

**DRY CLEANING SYSTEM.** Machinery or equipment in which textiles are immersed or agitated in solvent or in which dry cleaning solvent is extracted from textiles.

**DRY-CHEMICAL EXTINGUISHING AGENT.** A powder composed of small particles, usually of sodium bicarbonate, potassium bicarbonate, urea-potassium-based bicarbonate, potassium chloride or monoammonium phosphate, with added particulate material supplemented by special treatment to provide resistance to packing, resistance to moisture absorption (caking) and the proper flow capabilities.

**DUST COLLECTION SYSTEM.** A combination of equipment designed to contain, capture and collect airborne *combustible dusts*.

**DUTCH DOOR.** A door divided horizontally so that the top can be operated independently from the bottom.

**[A] DWELLING.** A building that contains one or two *dwelling units* used, intended or designed to be used, rented, leased, let or hired out to be occupied for living purposes.

**[A] DWELLING UNIT.** A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

**EARLY SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER.** A sprinkler *listed* for early suppression fast-response performance.

**[BE] EGRESS COURT.** A *court* or *yard* which provides access to a *public way* for one or more *exits*.

**[W] ELECTRICAL CODE.** The *National Electrical Code*, promulgated by the National Fire Protection Association, as adopted by rule or local ordinance under the authority of chapter 19.28 RCW.

**ELECTROSTATIC FLUIDIZED BED.** A container holding powder coating material that is aerated from below so as to form an air-supported expanded cloud of such material that is electrically charged with a charge opposite to that of the object to be coated. Such object is transported through the container immediately above the charged and aerated materials in order to be coated.

**ELEVATOR GROUP.** A grouping of elevators in a building located adjacent or directly across from one another that respond to a common hall call button(s).

**EMERGENCY ALARM SYSTEM.** A system to provide indication and warning of emergency situations involving hazardous materials.

**EMERGENCY CONTROL STATION.** An *approved* location on the premises where signals from emergency equipment are received and which is staffed by trained personnel.

**[BE] EMERGENCY ESCAPE AND RESCUE OPENING.** An operable exterior window, door or other similar device that provides for a means of escape and access for rescue in the event of an emergency.

**EMERGENCY EVACUATION DRILL.** An exercise performed to train staff and occupants and to evaluate their efficiency and effectiveness in carrying out emergency evacuation procedures.

**[S] EMERGENCY POWER SYSTEM.** ~~((A source of automatic electric power of a required capacity and duration to operate required life safety, fire alarm, detection and ventilation systems in the event of a failure of the primary power. Emergency power systems are required for electrical loads where interruption of the primary power could result in loss of human life or serious injuries.))~~ An electrical system that complies with *Seattle Electrical Code* Article 700.

## DEFINITIONS

**[W] EMERGENCY RESPONDER COMMUNICATIONS ENHANCEMENT SYSTEM (ERCES).** An infrastructure solution installed within a building to enhance the communications capabilities for first responders that utilizes solutions such as a signal booster, voting receiver, base station, or other technology capable of enhancing the radio frequency (RF) to ensure effective public safety communications.

**EMERGENCY SHUTOFF VALVE.** A valve designed to shut off the flow of gases or liquids.

**EMERGENCY SHUTOFF VALVE, AUTOMATIC.** A fail-safe automatic-closing valve designed to shut off the flow of gases or liquids initiated by a control system that is activated by automatic means.

**EMERGENCY SHUTOFF VALVE, MANUAL.** A manually operated valve designed to shut off the flow of gases or liquids.

**EMERGENCY VOICE/ALARM COMMUNICATIONS.** Dedicated manual or automatic facilities for originating and distributing voice instructions, as well as alert and evacuation signals pertaining to a fire emergency, to the occupants of a building.

**[BE] EMPLOYEE WORK AREA.** All or any portion of a space used only by employees and only for work. *Corridors*, toilet rooms, kitchenettes and break rooms are not employee work areas.

**ENERGY STORAGE MANAGEMENT SYSTEM.** An electronic system that protects energy storage systems from operating outside their safe operating parameters and disconnects electrical power to the ESS or places it in a safe condition if potentially hazardous temperatures or other conditions are detected.

**ENERGY STORAGE SYSTEM (ESS).** One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time.

**ENERGY STORAGE SYSTEM, ELECTROCHEMICAL.** An energy storage system that stores energy and produces electricity using chemical reactions. It includes, among others, battery ESS and capacitor ESS.

**ENERGY STORAGE SYSTEM, MOBILE.** An energy storage system capable of being moved and utilized for temporary energy storage applications, and not installed as fixed or stationary electrical equipment. The system can include integral wheels for transportation or be loaded on a trailer and unloaded for charging, storage and deployment.

**ENERGY STORAGE SYSTEM, STATIONARY.** An energy storage system installed as fixed or stationary electrical equipment in a permanent location.

**ENERGY STORAGE SYSTEM, WALK-IN UNIT.** A prefabricated building that contains energy storage systems. It includes doors that provide walk-in access for personnel to maintain, test and service the equipment, and is typically used in outdoor and mobile ESS applications.

**ENERGY STORAGE SYSTEM CABINET.** A cabinet containing components of the energy storage system that is included in the UL 9540 listing for the system. Personnel are not able to enter the enclosure other than reaching in to access components for maintenance purposes.

**ENERGY STORAGE SYSTEM COMMISSIONING.** A systematic process that provides documented confirmation that an energy storage system functions according to the intended design criteria and complies with applicable code requirements.

**ENERGY STORAGE SYSTEM DECOMMISSIONING.** A systematic process that provides documentation and procedures that allow an energy storage system to be safely de-energized, disassembled, readied for shipment or storage, and removed from the premises in accordance with applicable code requirements.

**[BG] EQUIPMENT PLATFORM.** An unoccupied, elevated platform used exclusively for mechanical systems or industrial process equipment, including the associated elevated walkways, *stairways*, *alternating tread devices* and ladders necessary to access the platform (see Section 505.3 of the *International Building Code*).

**EXCESS FLOW CONTROL.** A fail-safe system or other *approved* means designed to shut off flow caused by a rupture in pressurized piping systems.

**EXCESS FLOW VALVE.** A valve inserted into a *compressed gas* cylinder, portable tank or stationary tank that is designed to positively shut off the flow of gas in the event that its predetermined flow is exceeded.

**EXHAUSTED ENCLOSURE.** An appliance or piece of equipment which consists of a top, a back and two sides providing a means of local exhaust for capturing gases, fumes, vapors and mists. Such enclosures include laboratory hoods, exhaust fume hoods and similar appliances and equipment used to retain and exhaust locally the gases, fumes, vapors and mists that could be released. Rooms or areas provided with general ventilation, in themselves, are not exhausted enclosures.

**EXISTING.** Buildings, facilities or conditions that are already in existence, constructed or officially authorized prior to the adoption of this code.

**[S] EXISTING BUILDING, EXISTING STRUCTURE.** A building or structure erected prior to the date of adoption of the appropriate code, or one for which a valid certificate of occupancy has been issued, or one that has passed a final inspection.



[BE] **EXIT.** That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, *exterior exit stairways* and *ramps* and *horizontal exits*.

[BE] **EXIT ACCESS.** That portion of a *means of egress* system that leads from any occupied portion of a building or structure to an *exit*.

[BE] **EXIT ACCESS DOORWAY.** A door or access point along the path of egress travel from an occupied room, area or space where the path of egress enters an intervening room, *corridor*, *exit access stairway* or *ramp*.

[BE] **EXIT ACCESS RAMP.** A *ramp* within the *exit access* portion of the *means of egress* system.

[BE] **EXIT ACCESS STAIRWAY.** A *stairway* within the *exit access* portion of the *means of egress* system.

[BE] **EXIT DISCHARGE.** That portion of a *means of egress* system between the termination of an *exit* and a *public way*.

[BE] **EXIT DISCHARGE, LEVEL OF.** The *story* at the point at which an *exit* terminates and an *exit discharge* begins.

[S][BE] **EXIT PASSAGEWAY.** An *exit* component that ~~((is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives, and))~~ provides for a protected path of egress travel in a horizontal direction to the *exit discharge*.

**EXPANDED PLASTIC.** A foam or cellular plastic material having a reduced density based on the presence of numerous small cavities or cells dispersed throughout the material.

**EXPLOSION.** An effect produced by the sudden violent expansion of gases, which may be accompanied by a shock wave or disruption, or both, of enclosing materials or structures. An explosion could result from any of the following:

1. Chemical changes such as rapid oxidation, *deflagration* or *detonation*, decomposition of molecules and runaway polymerization (usually *detonations*).
2. Physical changes such as pressure tank ruptures.
3. Atomic changes (nuclear fission or fusion).

**EXPLOSIVE.** A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters.

The term “explosive” includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive by the *hazardous materials* regulations of DOTn 49 CFR Parts 100–185.

**High explosive.** *Explosive material*, such as dynamite, which can be caused to detonate by means of a No. 8 test blasting cap where unconfined.

**Low explosive.** *Explosive material* that will burn or deflagrate when ignited. It is characterized by a rate of reaction that is less than the speed of sound. Examples of low *explosives* include, but are not limited to, black powder, safety fuse, igniters, igniter cord, fuse lighters, fireworks and propellants, 1.3C.

**Mass-detonating explosives.** Division 1.1, 1.2 and 1.5 *explosives* alone or in combination, or loaded into various types of ammunition or containers, most of which can be expected to explode virtually instantaneously when a small portion is subjected to fire, severe concussion, impact, the impulse of an initiating agent or the effect of a considerable discharge of energy from without. Materials that react in this manner represent a mass explosion hazard. Such an *explosive* will normally cause severe structural damage to adjacent objects. Explosive propagation could occur immediately to other items of ammunition and *explosives* stored sufficiently close to and not adequately protected from the initially exploding pile with a time interval short enough so that two or more quantities must be considered as one for quantity-distance purposes.

**UN/DOTn Class 1 explosives.** The former classification system used by DOTn included the terms “high” and “low” *explosives* as defined herein. The following terms further define *explosives* under the current system applied by DOTn for all *explosive materials* defined as hazard Class 1 materials. Compatibility group letters are used in concert with the division to specify further limitations on each division noted (for example, the letter G identifies the material as a pyrotechnic substance or article containing a pyrotechnic substance and similar materials).

**Division 1.1.** *Explosives* that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.

**Division 1.2.** *Explosives* that have a projection hazard but not a mass explosion hazard.

**Division 1.3.** *Explosives* that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

**Division 1.4.** *Explosives* that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.

## DEFINITIONS

**Division 1.5.** Very insensitive *explosives*. This division is comprised of substances that have a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to *detonation* under normal conditions of transport.

**Division 1.6.** Extremely insensitive articles which do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

**EXPLOSIVE MATERIAL.** The term “*explosive*” material means *explosives*, blasting agents and detonators.

**[BE] EXTERIOR EXIT RAMP.** An *exit* component that serves to meet one or more *means of egress* design requirements, such as required number of *exits* or *exit access* travel distance, and is open to yards, *courts* or *public ways*.

**[BE] EXTERIOR EXIT STAIRWAY.** An *exit* component that serves to meet one or more *means of egress* design requirements, such as required number of *exits* or *exit access* travel distance, and is open to yards, *courts* or *public ways*.

**[BF] EXTERIOR WALL.** A wall, bearing or nonbearing, that is used as an enclosing wall for a building, other than a *fire wall*, and that has a slope of 60 degrees (1.05 rad) or greater with the horizontal plane.

**EXTRA-HIGH-RACK COMBUSTIBLE STORAGE.** Storage on racks of Class I, II, III or IV commodities that exceed 40 feet (12 192 mm) in height and storage on racks of high-hazard commodities that exceed 30 feet (9144 mm) in height.

**FABRICATION AREA.** An area within a semiconductor fabrication facility and related research and development areas in which there are processes using hazardous production materials. Such areas are allowed to include ancillary rooms or areas such as dressing rooms and offices that are directly related to the fabrication area processes.

**[A] FACILITY.** A building or use in a fixed location including exterior storage areas for flammable and combustible substances and hazardous materials, piers, wharves, tank farms and similar uses. This term includes recreational vehicles, mobile home and manufactured housing parks, sales and storage lots.

**FAIL-SAFE.** A design condition incorporating a feature for automatically counteracting the effect of an anticipated possible source of failure; also, a design condition eliminating or mitigating a hazardous condition by compensating automatically for a failure or malfunction.

**FALLOUT AREA.** The area over which aerial shells are fired. The shells burst over the area, and unsafe debris and malfunctioning aerial shells fall into this area. The fallout area is the location where a typical aerial shell dud falls to the ground, depending on the wind and the angle of mortar placement.

**FALSE ALARM.** The willful and knowing initiation or transmission of a signal, message or other notification of an event of fire when no such danger exists.

**FINES.** Small pieces or splinters of wood byproducts that will pass through a 0.25-inch (6.4 mm) screen.

**FIRE ALARM.** The giving, signaling or transmission to any public fire station, or company or to any officer or employee thereof, whether by telephone, spoken word or otherwise, of information to the effect that there is a fire at or near the place indicated by the person giving, signaling or transmitting such information.

**FIRE ALARM BOX, MANUAL.** See “*Manual fire alarm box.*”

**FIRE ALARM CONTROL UNIT.** A system component that receives inputs from automatic and manual fire alarm devices and may be capable of supplying power to detection devices and transponder(s) or off-premises transmitter(s). The control unit may be capable of providing a transfer of power to the notification appliances and transfer of condition to relays or devices.

**FIRE ALARM SIGNAL.** A signal initiated by a fire alarm-initiating device such as a manual fire alarm box, automatic fire detector, waterflow switch or other device whose activation is indicative of the presence of a fire or fire signature.

**[S] FIRE ALARM SYSTEM.** A system or portion of a combination system consisting of components and circuits arranged to monitor and annunciate the status of fire alarm or supervisory signal-initiating devices and to initiate the appropriate response to those signals. Combination, Household, Municipal, Protected Premises (Local), Building, Dedicated Function and Releasing are types of fire alarm systems.

**FIRE APPARATUS ACCESS ROAD.** A road that provides fire apparatus access from a fire station to a facility, building or portion thereof. This is a general term inclusive of all other terms such as *fire lane*, public street, private street, parking lot lane and access roadway.

**[BF] FIRE AREA.** The aggregate floor area enclosed and bounded by *fire walls*, *fire barriers*, *exterior walls* or *horizontal assemblies* of a building. Areas of the building not provided with surrounding walls shall be included in the fire area if such areas are included within the horizontal projection of the roof or floor next above.

**[BF] FIRE BARRIER.** A *fire-resistance-rated* wall assembly of materials designed to restrict the spread of fire in which continuity is maintained.

**FIRE CHIEF.** The chief officer of the fire department serving the jurisdiction, or a duly authorized representative.

**FIRE CODE OFFICIAL.** The *fire chief* or other designated authority charged with the administration and enforcement of the code, or a duly authorized representative.

**FIRE COMMAND CENTER.** The principal attended or unattended location where the status of detection, alarm communications and control systems is displayed, and from which the system(s) can be manually controlled.

**[BF] FIRE DAMPER.** A *listed* device installed in ducts and air transfer openings designed to close automatically upon detection of heat and resist the passage of flame. Fire dampers are classified for use in either static systems that will automatically shut down in the event of a fire, or in dynamic systems that continue to operate during a fire. A dynamic fire damper is tested and rated for closure under elevated temperature airflow.

**FIRE DEPARTMENT MASTER KEY.** A limited issue key of special or controlled design to be carried by fire department officials in command which will open key boxes on specified properties.

**202 Point of Information**

The fire code official has approved the “KnoxBox” as the access key box for use in Seattle.

**[S] FIRE DETECTION SYSTEM.** A system of smoke or heat detectors monitored at an *approved* central station, with no requirement for notification appliances in the building.

**FIRE DETECTOR, AUTOMATIC.** A device designed to detect the presence of a fire signature and to initiate action.

**[S] FIRE DISTRICT.** That part of Seattle within the boundary described as follows:

Beginning at the intersection of the center line of Alaskan Way and Clay Street; thence northeasterly along the center line of Clay Street to an intersection with the center line of Denny Way; thence easterly along the center line of Denny Way to an intersection with the center line of Yale Avenue; thence southeasterly along the center line of Yale Avenue to an intersection with the center line of Interstate Highway 5; thence southerly and southeasterly along the center line of Interstate 5 to an intersection with the center line of 7th Avenue South; thence southerly along the center line of 7th Avenue South to an intersection with the center line of Dearborn Street; thence westerly along the center line of Dearborn Street to an intersection with the center line of Airport Way; thence northwesterly along the center line of Airport Way to an intersection with the center line of 4th Avenue South; thence southerly along the center line of 4th Avenue south to an intersection with the center line of South Royal Brougham Way; thence westerly along said center line of South Royal Brougham Way to an intersection with the center line of South Alaskan Way; thence southerly along the center line of South Alaskan Way to an intersection with the center line of South Massachusetts Street; thence westerly along the centerline of South Massachusetts Street to the Outer Harbor Line in Elliott Bay; thence northerly and northwesterly along said Outer Harbor Line to an intersection with the center line of West Harrison Street; thence easterly along the center line of West Harrison Street to an intersection with the center line of Alaskan Way; then southeasterly along the center line of Alaskan Way to the point of beginning.

Buildings and structures located partially within and partially outside the Fire District are considered to be located in the Fire District.

**202 Point of Information**

For a map of the City of Seattle Fire District, see the Seattle Building Code.

**[BF] FIRE DOOR.** The door component of a fire door assembly.

**[BF] FIRE DOOR ASSEMBLY.** Any combination of a fire door, frame, hardware and other accessories that together provide a specific degree of fire protection to the opening.

**[BF] FIRE EXIT HARDWARE.** Panic hardware that is *listed* for use on *fire door assemblies*.

**[S] FIRE HAZARD.** Any situation, process, material, or condition that, on the basis of applicable data, can cause a fire or explosion or that can provide a ready fuel supply to augment the spread or intensity of a fire or explosion, all of which pose a threat to life or property.

**FIRE LANE.** A road or other passageway developed to allow the passage of fire apparatus. A fire lane is not necessarily intended for vehicular traffic other than fire apparatus.

**[BF] FIRE PARTITION.** A vertical assembly of materials designed to restrict the spread of fire in which openings are protected.

**FIRE POINT.** The lowest temperature at which a liquid will ignite and achieve sustained burning when exposed to a test flame in accordance with ASTM D92.

**[BF] FIRE PROTECTION RATING.** The period of time that an opening protective assembly will maintain the ability to confine a fire as determined by tests prescribed in Section 716 of the *International Building Code*. Ratings are stated in hours or minutes.

## DEFINITIONS

**FIRE PROTECTION SYSTEM.** *Approved* devices, equipment and systems or combinations of systems used to detect a fire, activate an alarm, extinguish or control a fire, control or manage smoke and products of a fire or any combination thereof.

**[BF] FIRE RESISTANCE.** That property of materials or their assemblies that prevents or retards the passage of excessive heat, hot gases or flames under conditions of use.

**FIRE SAFETY FUNCTIONS.** Building and fire control functions that are intended to increase the level of life safety for occupants or to control the spread of the harmful effects of fire.

**[S][BF] FIRE SEPARATION DISTANCE.** The distance measured from the building face to one of the following:

1. The closest interior *lot line*.
2. To the ~~((centerline))~~ opposite side of a street, an alley or *public way*.
3. To an imaginary line between two buildings on the lot.

The distance shall be measured at right angles from the face of the wall.

**[S][BF] FIRE WALL.** A *fire-resistance-rated* wall having protected openings, which restricts the spread of fire and extends continuously from the foundation to or through the roof, ~~((with sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall.))~~

**FIRE WATCH.** A temporary measure intended to ensure continuous and systematic surveillance of a building or portion thereof by one or more qualified individuals for the purposes of identifying and controlling fire hazards, detecting early signs of unwanted fire, raising an alarm of fire and notifying the fire department.

**[BF] FIREBLOCKING.** Building materials, or materials *approved* for use as fireblocking, installed to resist the free passage of flame to other areas of the building through concealed spaces.

**[BF] FIRE-RESISTANCE RATING.** The period of time a building element, component or assembly maintains the ability to confine a fire, continues to perform a given structural function, or both, as determined by the tests, or the methods based on tests, prescribed in Section 703 of the *International Building Code*.

**[BF] FIRE-RESISTANT JOINT SYSTEM.** An assemblage of specific materials or products that are designed, tested and *fire-resistance rated* in accordance with either ASTM E1966 or UL 2079 to resist for a prescribed period of time the passage of fire through joints made in or between *fire-resistance-rated* assemblies.

**FIREWORKS.** Any composition or device for the purpose of producing a visible or an audible effect for entertainment purposes by combustion, *deflagration* or *detonation* that meets the definition of 1.3G fireworks or 1.4G fireworks.

**Fireworks, 1.3G.** Large fireworks devices, which are *explosive materials*, intended for use in fireworks displays and designed to produce audible or visible effects by combustion, *deflagration* or *detonation*. Such 1.3G fireworks include, but are not limited to, firecrackers containing more than 130 milligrams (2 grains) of explosive composition, aerial shells containing more than 40 grams of pyrotechnic composition and other display pieces which exceed the limits for classification as 1.4G fireworks. Such 1.3G fireworks are also described as Fireworks, UN 0335 by the DOTn.

**Fireworks, 1.4G.** Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visible or audible effects by combustion or *deflagration* that complies with the construction, chemical composition and labeling regulations of the DOTn for Fireworks, UN 0336, and the US Consumer Product Safety Commission as set forth in CPSC 16 CFR Parts 1500 and 1507.

**FIREWORKS DISPLAY.** A presentation of fireworks for a public or private gathering.

**[BG] FIXED BASE OPERATOR (FBO).** A commercial business granted the right by the airport sponsor to operate on an airport and provide aeronautical services such as fueling, hangaring, tie-down and parking, aircraft rental, aircraft maintenance and flight instruction.

**[BE] FIXED SEATING.** Furniture or fixtures designed and installed for the use of sitting and secured in place including bench-type seats and seats with or without back or arm rests.

**[S] FLAME EFFECT.** The combustion of solids, liquids, or gases to produce thermal, physical, visual, or audible phenomena before an audience.

**[BF] FLAME SPREAD.** The propagation of flame over a surface.

**[BF] FLAME SPREAD INDEX.** A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723.

**FLAMMABLE CRYOGENIC FLUID.** A *cryogenic fluid* that is flammable in its vapor state.

**FLAMMABLE FINISHES.** Coatings to articles or materials in which the material being applied is a *flammable liquid*, *combustible liquid*, combustible powder, fiberglass resin or flammable or combustible gel coating.

**FLAMMABLE GAS.** A material which is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a *boiling point* of 68°F (20°C) or less at 14.7 psia (101 kPa)] which:

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**Transverse flue space.** The space between rows of storage parallel to the direction of loading.

**FLUIDIZED BED.** A container holding powder coating material that is aerated from below so as to form an air-supported expanded cloud of such material through which the preheated object to be coated is immersed and transported.

**FOAM-EXTINGUISHING SYSTEM.** A special system discharging a foam made from concentrates, either mechanically or chemically, over the area to be protected.

**[BE] FOLDING AND TELESCOPIC SEATING.** Tiered seating having an overall shape and size that is capable of being reduced for purposes of moving or storing and is not a building element.

**[BG] FOSTER CARE FACILITIES.** Facilities that provide care to more than five children, 2-1/2 years of age or less.

**[W] FREQUENCY.** The particular waveband at which a communications system broadcasts or transmits.

**[W] FREQUENCY LICENSE HOLDER(S).** The person(s) or entity(s) that are issued the license from the frequency licensing authority of United States or other country of jurisdiction for the frequencies being used by both the in-building emergency responder communications enhancement system and the emergency services communications system that it enhances.

**[W] FREQUENCY LICENSING AUTHORITY.** The government authority in a country or territory that issues frequency licenses for the use of communications frequencies by authorized entities and individuals.

**FUEL CELL POWER SYSTEM, STATIONARY.** A stationary energy generation system that converts the chemical energy of a fuel and oxidant to electric energy (DC or AC electricity) by an electrochemical process.

**Field-fabricated fuel cell power system.** A *stationary fuel cell power system* that is assembled at the job site and is not a preengineered or prepackaged factory-assembled fuel cell power system.

**Preengineered fuel cell power system.** A *stationary fuel cell power system* consisting of components and modules that are produced in a factory, and shipped to the job site for assembly.

**Prepackaged fuel cell power system.** A *stationary fuel cell power system* that is factory assembled as a single, complete unit and shipped as a complete unit for installation at the job site.

**FUEL LIMIT SWITCH.** A mechanism, located on a tank vehicle, that limits the quantity of product dispensed at one time.

**FUMIGANT.** A substance which by itself or in combination with any other substance emits or liberates a gas, fume or vapor utilized for the destruction or control of insects, fungi, vermin, germs, rats or other pests, and shall be distinguished from insecticides and disinfectants which are essentially effective in the solid or liquid phases. Examples are methyl bromide, ethylene dibromide, hydrogen cyanide, carbon disulfide and sulfuryl fluoride.

**FUMIGATION.** The utilization within an enclosed space of a fumigant in concentrations that are hazardous or acutely toxic to humans.

**FURNACE CLASS A.** An oven or furnace that has heat utilization equipment operating at approximately atmospheric pressure wherein there is a potential explosion or fire hazard that could be occasioned by the presence of flammable volatiles or combustible materials processed or heated in the furnace.

**Note:** Such flammable volatiles or combustible materials can, for instance, originate from the following:

1. Paints, powders, inks, and adhesives from finishing processes, such as dipped, coated, sprayed and impregnated materials.
2. The substrate material.
3. Wood, paper and plastic pallets, spacers or packaging materials.
4. Polymerization or other molecular rearrangements.

Potentially flammable materials, such as quench oil, waterborne finishes, cooling oil or cooking oils, that present a hazard are ventilated according to Class A standards.

**FURNACE CLASS B.** An oven or furnace that has heat utilization equipment operating at approximately atmospheric pressure wherein there are no flammable volatiles or combustible materials being heated.

**FURNACE CLASS C.** An oven or furnace that has a potential hazard due to a flammable or other special atmosphere being used for treatment of material in process. This type of furnace can use any type of heating system and includes a special atmosphere supply system. Also included in the Class C classification are integral quench furnaces and molten salt bath furnaces.

**FURNACE CLASS D.** An oven or furnace that operates at temperatures from above ambient to over 5,000°F (2760°C) and at pressures normally below atmospheric using any type of heating system. These furnaces can include the use of special processing atmospheres.

**GAS CABINET.** A fully enclosed, ventilated, noncombustible enclosure used to provide an isolated environment for *compressed gas* cylinders in storage or use. Doors and access ports for exchanging cylinders and accessing pressure-regulating controls are allowed to be included.

**GAS DETECTION SYSTEM.** A system or portion of a combination system that utilizes one or more stationary sensors to detect the presence of a specified gas at a specified concentration and initiate one or more responses required by this code, such as notifying a responsible person, activating an alarm signal, or activating or deactivating equipment. A self-contained gas detection and alarm device is not classified as a gas detection system.

**GAS ROOM.** A separately ventilated, fully enclosed room in which only *compressed gases* and associated equipment and supplies are stored or used.

**GAS ROOM, HYDROGEN FUEL.** See “*Hydrogen fuel gas room.*”

**GASEOUS HYDROGEN SYSTEM.** An assembly of piping, devices and apparatus designed to generate, store, contain, distribute or transport a nontoxic, gaseous hydrogen-containing mixture having not less than 95-percent hydrogen gas by volume and not more than 1-percent oxygen by volume. Gaseous hydrogen systems consist of items such as *compressed gas* containers, reactors and appurtenances, including pressure regulators, pressure relief devices, manifolds, pumps, compressors and interconnecting piping and tubing and controls.

**GLOVE BOX.** A sealed enclosure in which items inside the box are handled exclusively using long gloves sealed to ports in the enclosure.

**[BE] GRADE FLOOR EMERGENCY ESCAPE AND RESCUE OPENING.** An emergency escape and rescue opening located such that the bottom of the clear opening is not more than 44 inches (1118 mm) above or below the finished ground level adjacent to the opening.

**[S][BG] GRADE PLANE.** A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the *lot line* or, where the *lot line* is more than 6 feet (1829 mm) from the building, between the building and a point 6 feet (1829 mm) from the building. For grade of structures built over water, see the *Seattle Building Code.*

**[BE] GRANDSTAND.** Tiered seating supported on a dedicated structural system and two or more rows high and is not a building element (see “*Bleachers*”).

**[W] GRAVITY-OPERATED DROP OUT VENTS.** Automatic smoke and heat vents containing heat-sensitive glazing designed to shrink and drop out of the vent openings when exposed to fire.

**[BG] GROUP HOME.** A facility for social rehabilitation, substance abuse or mental health problems that contains a group housing arrangement that provides custodial care but does not provide medical care.

**[BE] GUARD.** A building component or a system of building components located at or near the open sides of elevated walking surfaces that minimizes the possibility of a fall from the walking surface to a lower level.

**[BG] GUESTROOM.** A room used or intended to be used by one or more guests for living or sleeping purposes.

**[BS] GYPSUM BOARD.** Gypsum wallboard, gypsum sheathing, gypsum base for gypsum veneer plaster, exterior gypsum soffit board, predecorated gypsum board or water-resistant gypsum backing board complying with the standards listed in Tables 2506.2 and 2507.2 and Chapter 35 of the *International Building Code.*

**[BG] HABITABLE SPACE.** A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.

**HALOGENATED EXTINGUISHING SYSTEM.** A fire-extinguishing system using one or more atoms of an element from the halogen chemical series: fluorine, chlorine, bromine and iodine.

**HANDLING.** The deliberate transport by any means to a point of storage or use.

**[BE] HANDRAIL.** A horizontal or sloping rail intended for grasping by the hand for guidance or support.

**HAZARDOUS MATERIALS.** Those chemicals or substances which are *physical hazards* or *health hazards* as defined and classified in this chapter, whether the materials are in usable or waste condition.

**HAZARDOUS PRODUCTION MATERIAL (HPM).** A solid, liquid or gas associated with semiconductor manufacturing that has a degree-of-hazard rating in health, flammability or instability of Class 3 or 4 as ranked by NFPA 704 and which is used directly in research, laboratory or production processes which have, as their end product, materials that are not hazardous.

**HEALTH HAZARD.** A classification of a chemical for which there is statistically significant evidence that acute or chronic health effects are capable of occurring in exposed persons. The term “health hazard” includes chemicals that are toxic, highly toxic and *corrosive*.

**HEAT DETECTOR.** See “*Detector, heat.*”

**[S][BG] HEIGHT, BUILDING.** The vertical distance from *grade plane* to the average height of the highest roof surface other than rooftop structures complying with Section 1510 of the *International Building Code.*

**[S] HELIPAD.** A structural surface that is used for the landing, taking off, taxiing and parking of helicopters.

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**HELIPORT.** An area of land or water or a structural surface that is used, or intended for use, for the landing and taking off of helicopters, and any appurtenant areas which are used, or intended for use, for heliport buildings and other heliport facilities.

**HELISTOP.** The same as “Heliport,” except that fueling, defueling, maintenance, repairs or storage of helicopters is not permitted.

**HI-BOY.** A cart used to transport hot roofing materials on a roof.

**HIGHER EDUCATION LABORATORY.** Laboratories in Group B occupancies used for educational purposes above the 12th grade. Storage, use and handling of chemicals in such laboratories shall be limited to purposes related to testing, analysis, teaching, research or developmental activities on a nonproduction basis.

**HIGHLY TOXIC.** A material which produces a lethal dose or lethal concentration which falls within any of the following categories:

1. A chemical that has a median lethal dose (LD<sub>50</sub>) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
2. A chemical that has a median lethal dose (LD<sub>50</sub>) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.
3. A chemical that has a median lethal concentration (LC<sub>50</sub>) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume or dust, when administered by continuous inhalation for one hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Mixtures of these materials with ordinary materials, such as water, might not warrant classification as highly toxic. While this system is basically simple in application, any hazard evaluation that is required for the precise categorization of this type of material shall be performed by experienced, technically competent persons.

**HIGHLY VOLATILE LIQUID.** A liquefied *compressed gas* with a *boiling point* of less than 68°F (20°C).

**HIGH-PILED COMBUSTIBLE STORAGE.** Storage of combustible materials in closely packed piles or combustible materials on pallets, in racks or on shelves where the top of storage is greater than 12 feet (3658 mm) in height. Where required by the *fire code official*, *high-piled combustible storage* also includes certain high-hazard commodities, such as rubber tires, Group A plastics, *flammable liquids*, idle pallets and similar commodities, where the top of storage is greater than 6 feet (1829 mm) in height.

**HIGH-PILED STORAGE AREA.** An area within a building which is designated, intended, proposed or actually used for *high-piled combustible storage*, including operating aisles.

**[W][S][BG] HIGH-RISE BUILDING.** A building with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access. For the purposes of this definition, an occupied roof with an occupant load of 50 or more in a building that is equipped with an automatic sprinkler system or an occupant load of 10 or more in a building not equipped with an automatic fire sprinkler system is considered to be an occupied floor.

**HIGH-VOLTAGE TRANSMISSION LINE.** An electrical power transmission line operating at or above 66 kilovolts.

**HIGHWAY.** A public street, public alley or public road.

**[S][A] HISTORIC BUILDINGS.** ~~((Any building or structure that is one or more of the following:))~~ See “Landmark.”

- ~~1. Listed, or certified as eligible for listing by the state historic preservation officer or the Keeper of the National Register of Historic Places, in the National Register of Historic Places.~~
- ~~2. Designated as historic under an applicable state or local law.~~
- ~~3. Certified as a contributing resource within a national register, state-designated or locally designated historic district.~~

**HOGGED MATERIALS.** Wood waste materials produced from the lumber production process.

**[M] HOOD.** An air-intake device used to capture by entrapment, impingement, adhesion or similar means, grease and similar contaminants before they enter a duct system.

**Type I.** A kitchen hood for collecting and removing grease vapors and smoke.

**Type II.** A general kitchen hood for collecting and removing steam vapor, heat, odors and products of combustion.

**[BF] HORIZONTAL ASSEMBLY.** A *fire-resistance-rated* floor or roof assembly of materials designed to restrict the spread of fire in which continuity is maintained.

**[BE] HORIZONTAL EXIT.** An *exit* component consisting of *fire-resistance-rated* construction and opening protectives intended to compartmentalize portions of a building thereby creating refuge areas that afford safety from fire and smoke from the area of fire origin.

**[W] HOSPICE CARE CENTERS.** A building or portion thereof used on a 24-hour basis for the provision of hospice services to terminally ill inpatients.

**[BG] HOSPITALS AND PSYCHIATRIC HOSPITALS.** Facilities that provide care or treatment for the medical, psychiatric, obstetrical, or surgical treatment of inpatient care recipients that are incapable of self-preservation.

**[S] HOT WORK.** Operations (~~(including)~~) involving cutting, welding, (~~(Thermit welding, brazing, soldering, grinding, thermal spraying, thawing pipe, installation of torch-applied roof systems)~~) burning, or (~~(any other)~~) similar (~~(activity)~~) operation that is capable of initiating fires or explosions.

**HOT WORK AREA.** The area exposed to sparks, hot slag, radiant heat, or convective heat as a result of the hot work.

**HOT WORK EQUIPMENT.** Electric or gas welding or cutting equipment used for hot work.

**HOT WORK PERMITS.** Permits issued by the responsible person at the facility under the hot work permit program permitting welding or other hot work to be done in locations referred to in Section 3503.3 and prepermitted by the *fire code official*.

**HOT WORK PROGRAM.** A permitted program, carried out by *approved* facilities-designated personnel, allowing them to oversee and issue permits for hot work conducted by their personnel or at their facility. The intent is to have trained, on-site, responsible personnel ensure that required hot work safety measures are taken to prevent fires and fire spread.

**HPM.** See “*Hazardous Production Material*.”

**HPM FACILITY.** See “*Semiconductor fabrication facility*.”

**HPM ROOM.** A room used in conjunction with or serving a Group H-5 occupancy, where HPM is stored or used and which is classified as a Group H-2, H-3 or H-4 occupancy.

**HYDROGEN FUEL GAS ROOM.** A room or space that is intended exclusively to house a *gaseous hydrogen system*.

**IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).** The concentration of airborne contaminants that poses a threat of death, immediate or delayed permanent adverse health effects, or effects that could prevent escape from such an environment. This contaminant concentration level is established by the National Institute of Occupational Safety and Health (NIOSH) based on both toxicity and flammability. It generally is expressed in parts per million by volume (ppm v/v) or milligrams per cubic meter (mg/m<sup>3</sup>). Where adequate data do not exist for precise establishment of IDLH concentrations, an independent certified industrial hygienist, industrial toxicologist, appropriate regulatory agency or other source *approved* by the *fire code official* shall make such determination.

**[S] IMMINENT HAZARD.** An act or condition that is judged to present a danger to persons or property that is so urgent and severe that it requires immediate corrective or preventive action.

**IMPAIRMENT COORDINATOR.** The person responsible for the maintenance of a particular *fire protection system*.

**[BG] INCAPABLE OF SELF-PRESERVATION.** Persons who, because of age, physical limitations, mental limitations, chemical dependency or medical treatment, cannot respond as an individual to an emergency situation.

**INCOMPATIBLE MATERIALS.** Materials that, when mixed, have the potential to react in a manner which generates heat, fumes, gases or byproducts which are hazardous to life or property.

**INERT GAS.** A gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert gases do not exhibit either physical or *health hazard* properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a *compressed gas*. Some of the more common inert gases include argon, helium, krypton, neon, nitrogen and xenon.

**INHABITED BUILDING.** A building regularly occupied in whole or in part as a habitation for people, or any place of religious worship, schoolhouse, railroad station, store or other structure where people are accustomed to assemble, except any building or structure occupied in connection with the manufacture, transportation, storage or use of *explosive materials*.

**INITIATING DEVICE.** A system component that originates transmission of a change-of-state condition, such as in a smoke detector, manual fire alarm box, or supervisory switch.

**INSECTICIDAL FOGGING.** The utilization of insecticidal liquids passed through fog-generating units where, by means of pressure and turbulence, with or without the application of heat, such liquids are transformed and discharged in the form of fog or mist blown into an area to be treated.

**INTEGRATED TESTING (FIRE PROTECTION AND LIFE SAFETY SYSTEM).** A testing procedure to establish the operational status, interaction and coordination of two or more fire protection and safety systems.

**[BE] INTERIOR EXIT RAMP.** An *exit* component that serves to meet one or more *means of egress* design requirements, such as required number of *exits* or *exit access* travel distance, and provides for a protected path of egress travel to the *exit discharge* or *public way*.



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**[BE] INTERIOR EXIT STAIRWAY.** An *exit* component that serves to meet one or more *means of egress* design requirements, such as required number of *exits* or *exit access* travel distance, and provides for a protected path of egress travel to the *exit discharge* or *public way*.

**[BG] INTERIOR FINISH.** Interior finish includes interior wall and ceiling finish and interior floor finish.

**[BG] INTERIOR FLOOR-WALL BASE.** Interior floor finish trim used to provide a functional or decorative border at the intersection of walls and floors.

**[BG] INTERIOR WALL AND CEILING FINISH.** The exposed interior surfaces of buildings, including but not limited to: fixed or movable walls and partitions; toilet room privacy partitions; columns; ceilings; and interior wainscoting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural *fire resistance* or similar purposes, but not including trim.

**IRRITANT.** A chemical which is not *corrosive*, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact. A chemical is a skin irritant if, when tested on the intact skin of albino rabbits by the methods of CPSC 16 CFR Part 1500.41 for an exposure of four or more hours or by other appropriate techniques, it results in an empirical score of 5 or more. A chemical is classified as an eye irritant if so determined under the procedure listed in CPSC 16 CFR Part 1500.42 or other *approved* techniques.

**[A] JURISDICTION.** The governmental unit that has adopted this code.

**KEY BOX.** A secure device with a lock operable only by a fire department master key, and containing building entry keys and other keys that may be required for access in an emergency.

**[A] LABELED.** Equipment, materials or products to which have been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, *approved* agency or other organization concerned with product evaluation that maintains periodic inspection of the production of such labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

**LABORATORY.** A facility where the containers used for reactions, transfers, and other handling of chemicals are designed to be easily and safely manipulated by one person. A laboratory is a workplace where chemicals are used or synthesized on a nonproduction basis.

**LABORATORY SUITE.** A fire-rated enclosed laboratory area that will provide one or more laboratory spaces, within a Group B educational occupancy, that are permitted to include ancillary uses such as offices, bathrooms and corridors that are contiguous with the laboratory area, and are constructed in accordance with Chapter 38.

**[S] LANDMARK.** A building or structure that is subject to a requirement to obtain a certificate of approval from the City Landmarks Preservation Board before altering or making significant changes to specific features or characteristics, that has been nominated for designation and the City Landmarks Preservation Board has not issued a determination regarding designation, that has been designated for preservation by the City Landmarks Preservation Board, that has been designated for preservation by the State of Washington, that has been listed or determined eligible to be listed in the National Register of Historic Places, or that is located in a landmark or special review district subject to a requirement to obtain a certificate of approval before making a change to the external appearance of a structure.

**LEVEL OF EXIT DISCHARGE.** See “*Exit discharge, level of.*”

**LIFE SAFETY SYSTEMS.** Systems, devices and equipment that enhance or facilitate evacuation, smoke control, compartmentation and/or isolation.

**LIMITED SPRAYING SPACE.** An area in which operations for touch-up or spot painting of a surface area of 9 square feet (0.84 m<sup>2</sup>) or less are conducted.

**[W] LIMITED VERBAL OR PHYSICAL ASSISTANCE.** Persons who, because of age, physical limitations, cognitive limitations, treatment or chemical dependency, and may not independently recognize, respond or evacuate without limited verbal or physical assistance during an emergency situation. Verbal assistance includes prompting, giving and repeating instructions. Physical assistance includes assistance with transfers to walking aids or mobility devices and assistance with egress.

**LIQUEFIED NATURAL GAS (LNG).** A fluid in the liquid state composed predominantly of methane and which may contain minor quantities of ethane, propane, nitrogen or other components normally found in natural gas.

**LIQUEFIED PETROLEUM GAS (LP-gas).** A material which is composed predominantly of the following hydrocarbons or mixtures of them: propane, propylene, butane (normal butane or isobutane) and butylenes.

**LIQUID.** A material having a melting point that is equal to or less than 68°F (20°C) and a *boiling point* which is greater than 68°F (20°C) at 14.7 pounds per square inch absolute (psia) (101 kPa). Where not otherwise identified, the term “liquid” includes both *flammable* and *combustible liquids*.

**LIQUID OXYGEN AMBULATORY CONTAINER.** A container used for liquid oxygen not exceeding 0.396 gallons (1.5 liters) specifically designed for use as a medical device as defined by 21 USC Chapter 9 that is intended for portable therapeutic use and to be filled from its companion base unit, a liquid oxygen home care container.

**LIQUID OXYGEN HOME CARE CONTAINER.** A container used for liquid oxygen not exceeding 15.8 gallons (60 liters) specifically designed for use as a medical device as defined by 21 USC Chapter 9 that is intended to deliver gaseous oxygen for therapeutic use in a home environment.

**LIQUID STORAGE ROOM.** A room classified as a Group H-3 occupancy used for the storage of *flammable* or *combustible liquids* in a closed condition.

**LIQUID STORAGE WAREHOUSE.** A building classified as a Group H-2 or H-3 occupancy used for the storage of *flammable* or *combustible liquids* in a closed condition.

**[A] LISTED.** Equipment, materials, products or services included in a list published by an organization acceptable to the *fire code official* and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose.

**LOCKDOWN.** An emergency situation, in other than a Group I-3 occupancy, requiring that the occupants be sheltered and secured in place within a building when normal evacuation would put occupants at risk.

**[BG] LODGING HOUSE.** A one-family *dwelling* where one or more occupants are primarily permanent in nature and rent is paid for guestrooms.

**LONGITUDINAL FLUE SPACE.** See “*Flue spaces—longitudinal.*”

**[A] LOT.** A portion or parcel of land considered as a unit.

**[A] LOT LINE.** A line dividing one lot from another, or from a street or any public place.

**[BE] LOW ENERGY POWER-OPERATED DOOR.** Swinging, sliding or folding door which opens automatically upon an action by a pedestrian such as pressing a push plate or waving a hand in front of a sensor. The door closes automatically, and operates with decreased forces and decreased speeds. See also “*Power-assisted door*” and “*Power-operated door.*”

**LOWER EXPLOSIVE LIMIT (LEL).** See “*Lower flammable limit.*”

**LOWER FLAMMABLE LIMIT (LFL).** The minimum concentration of vapor in air at which propagation of flame will occur in the presence of an ignition source. The LFL is sometimes referred to as LEL or lower explosive limit.

**LOW-PRESSURE TANK.** A storage tank designed to withstand an internal pressure greater than 0.5 pound per square inch gauge (psig) (3.4 kPa) but not greater than 15 psig (103.4 kPa).

**LP-GAS CONTAINER.** Any vessel, including cylinders, tanks, portable tanks and cargo tanks, used for transporting or storing LP-gases.

**MAGAZINE.** A building, structure or container, other than an operating building, *approved* for storage of *explosive materials*.

**Indoor.** A portable structure, such as a box, bin or other container, constructed as required for Type 2, 4 or 5 magazines in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555 so as to be fire resistant and theft resistant.

**Type 1.** A permanent structure, such as a building or igloo, that is bullet resistant, fire resistant, theft resistant, weather resistant and ventilated in accordance with the requirements of NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555.

**Type 2.** A portable or mobile structure, such as a box, skid-magazine, trailer or semitrailer, constructed in accordance with the requirements of NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555 that is fire resistant, theft resistant, weather resistant and ventilated. If used outdoors, a Type 2 magazine is also bullet resistant.

**Type 3.** A fire resistant, theft resistant and weather resistant “day box” or portable structure constructed in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555 used for the temporary storage of *explosive materials*.

**Type 4.** A permanent, portable or mobile structure such as a building, igloo, box, semitrailer or other mobile container that is fire resistant, theft resistant and weather resistant and constructed in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555.

**Type 5.** A permanent, portable or mobile structure such as a building, igloo, box, bin, tank, semitrailer, bulk trailer, tank trailer, bulk truck, tank truck or other mobile container that is theft resistant, which is constructed in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555.

**MAGNESIUM.** The pure metal and alloys, of which the major part is magnesium.

**MALL.** See “*Covered mall building.*”

**MANUAL FIRE ALARM BOX.** A manually operated device used to initiate an alarm signal.

**MANUAL STOCKING METHODS.** Stocking methods utilizing ladders or other nonmechanical equipment to move stock.

**[S] MARINA.** (~~Any portion of the ocean or inland water, either naturally or artificially protected, for the mooring, servicing or safety of vessels and shall include artificially protected works, the public or private lands ashore, and structures or facilities provided within the enclosed body of water and ashore for the mooring or servicing of vessels or the servicing of their crews or~~

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~~passengers-))~~ A facility, generally on the waterfront, that stores and services boats in berths, on moorings, and in dry storage or dry stack storage. The services provided by a marina are those generally associated with active boat use, such as berthing of boats, fueling, sanitary sewage pumpout, seasonal boat storage or short-term storage, seasonal boat painting, boat engine maintenance, and voyage repairs. Servicing of a greater nature is generally associated with boatyard facilities. A marina can also incorporate recreational facilities, ship's stores, offices, restaurants, or other upland amenities.

**MARINE MOTOR FUEL-DISPENSING FACILITY.** That portion of property where *flammable* or *combustible liquids* or gases used as fuel for watercraft are stored and dispensed from fixed equipment on shore, piers, wharves, floats or barges into the fuel tanks of watercraft and shall include all other facilities used in connection therewith.

**[SJ] MARINE TERMINAL.** A facility comprised of one or more berths, piers, wharves, loading and unloading areas, warehouses, and storage yards and used for transfer of people and/or cargo between waterborne and land transportation modes.

**MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA.** The maximum amount of a hazardous material allowed to be stored or used within a *control area* inside a building or an *outdoor control area*. The maximum allowable quantity per *control area* is based on the material state (solid, liquid or gas) and the material storage or use conditions.

**[BE] MEANS OF EGRESS.** A continuous and unobstructed path of vertical and horizontal egress travel from any occupied portion of a building or structure to a *public way*. A *means of egress* consists of three separate and distinct parts: the *exit access*, the *exit* and the *exit discharge*.

**[SJ] MECHANICAL-ACCESS ENCLOSED PARKING GARAGE.** An enclosed parking garage that employs parking machines, lifts, elevators or other mechanical devices for vehicle moving from and to street level and in which public occupancy in the garage is prohibited in all areas except the vehicle access bay.

**[SJ] MECHANICAL-ACCESS OPEN PARKING GARAGES.** Open parking garages employing parking machines, lifts, elevators or other mechanical devices for vehicles moving from and to street level and in which public occupancy is prohibited above the street level.

**MECHANICAL STOCKING METHODS.** Stocking methods utilizing motorized vehicles or hydraulic jacks to move stock.

**[BG] MEDICAL CARE.** Care involving medical or surgical procedures, nursing or for psychiatric purposes.

**MEMBRANE STRUCTURE.** An air-inflated, air-supported, cable or frame-covered structure as defined by the *International Building Code* and not otherwise defined as a tent. See Chapter 31 of the *International Building Code*.

**[BF] MEMBRANE-PENETRATION FIRESTOP SYSTEM.** An assemblage consisting of a *fire-resistance-rated* floor-ceiling, roof-ceiling or wall assembly, one or more penetrating items installed into or passing through the breach in one side of the assembly and the materials or devices, or both, installed to resist the spread of fire into the assembly for a prescribed period of time.

**[BE] MERCHANDISE PAD.** A merchandise pad is an area for display of merchandise surrounded by *aisles*, permanent fixtures or walls. Merchandise pads contain elements such as nonfixed and moveable fixtures, cases, racks, counters and partitions as indicated in Section 105.2 of the *International Building Code* from which customers browse or shop.

**METAL HYDRIDE.** A generic name for compounds composed of metallic element(s) and hydrogen.

**METAL HYDRIDE STORAGE SYSTEM.** A *closed system* consisting of a group of components assembled as a package to contain metal-hydrogen compounds for which there exists an equilibrium condition where the hydrogen-absorbing metal alloy(s), hydrogen gas and the metal-hydrogen compound(s) coexist and where only hydrogen gas is released from the system in normal use.

**[BG] MEZZANINE.** An intermediate level or levels between the floor and ceiling of any story and in accordance with Section 505 of the *International Building Code*.

**MISCELLA.** A mixture, in any proportion, of the extracted oil or fat and the extracting solvent.

**[SJ] MISCELLANEOUS TIRE STORAGE.** The storage of rubber tires that is incidental to the main use of the building.

**[W] MOBILE FOOD PREPARATION ((VEHICLES)) VEHICLE.** ~~((Vehicles that contain cooking equipment))~~ Mobile food preparation vehicles that are equipped with appliances that produce smoke or grease-laden vapors or utilize LP-gas systems or CNG systems for the purpose of preparing and serving food to the public. Vehicles intended for private recreation shall not be considered mobile food preparation vehicles.

**MOBILE FUELING.** The operation of dispensing liquid fuels from tank vehicles into the fuel tanks of motor vehicles. Mobile fueling may also be known by the terms "Mobile fleet fueling," "Wet fueling" and "Wet hosing."

**MORTAR.** A tube from which fireworks shells are fired into the air.

**[W] MOTOR VEHICLE.** Includes, but not limited to, a vehicle, machine, tractor, trailer, or semitrailer, or any combination thereof, propelled or drawn by mechanical power and designed for use upon the highways in the transportation of passengers or property. It does not include a vehicle, locomotive or car operated exclusively on a rail or rails, or a trolley bus operated by electric power derived from a fixed overhead wire, furnishing local passenger transportation similar to street-railway service.

The term “motor vehicle” also includes freight containers or cargo tanks used, or intended for use, in connection with motor vehicles.

**MULTIPLE-STATION ALARM DEVICE.** Two or more single-station alarm devices that can be interconnected such that actuation of one causes all integral or separate audible alarms to operate. A multiple-station alarm device can consist of one single-station alarm device having connections to other detectors or to a manual fire alarm box.

**MULTIPLE-STATION SMOKE ALARM.** Two or more single-station alarm devices that are capable of interconnection such that actuation of one causes the appropriate alarm signal to operate in all interconnected alarms.

**NESTING.** A method of securing flat-bottomed *compressed gas* cylinders upright in a tight mass using a contiguous three-point contact system whereby all cylinders within a group have not less than three points of contact with other cylinders, walls or bracing.

**NET EXPLOSIVE WEIGHT (net weight).** The weight of *explosive material* expressed in pounds. The net explosive weight is the aggregate amount of *explosive material* contained within buildings, magazines, structures or portions thereof, used to establish quantity-distance relationships.

[W] NIGHTCLUB. An A-2 occupancy use in which the aggregate area of concentrated use of unfixed chairs and standing space that is specifically designated and primarily used for dancing or viewing performers exceeds 350 square feet (33 m<sup>2</sup>), excluding adjacent lobby areas. “Nightclub” does not include theaters with fixed seating, banquet halls, or lodge halls.

[S] NON-PRODUCTION LABORATORY FACILITY. A workplace facility where chemicals are used or synthesized on a non-production basis and the containers used for reactions, transfers, and other handling of chemicals are designed to be easily and safely manipulated by one person.

**NORMAL TEMPERATURE AND PRESSURE (NTP).** A temperature of 70°F (21°C) and a pressure of 1 atmosphere [14.7 psia (101 kPa)].

**[BE] NOSING.** The leading edge of treads of *stairs* and of landings at the top of *stairway flights*.

**NOTIFICATION ZONE.** See “*Zone, notification.*”

**NUISANCE ALARM.** An alarm caused by mechanical failure, malfunction, improper installation or lack of proper maintenance, or an alarm activated by a cause that cannot be determined.

**[BG] NURSING HOMES.** Facilities that provide care, including both intermediate care facilities and skilled nursing facilities, where any of the persons are incapable of self-preservation.

**OCCUPANCY CLASSIFICATION.** For the purposes of this code, certain occupancies are defined as follows:

**[BG] Group A, Assembly.** Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering of persons for purposes such as civic, social or religious functions; recreation, food or drink consumption; or awaiting transportation.

**[BG] Accessory with places of religious worship.** Accessory religious educational rooms and religious auditoriums with *occupant loads* of less than 100 per room or space are not considered separate occupancies.

**[BG] Assembly Group A-1.** Group A occupancy includes assembly uses, usually with fixed seating, intended for the production and viewing of performing arts or motion pictures including, but not limited to:

- Motion picture theaters
- Symphony and concert halls
- Television and radio studios admitting an audience
- Theaters

**[BG] Assembly Group A-2.** Group A-2 occupancy includes assembly uses intended for food and/or drink consumption including, but not limited to:

- Banquet halls
- Casinos (gaming areas)
- Night clubs
- Restaurants, cafeterias and similar dining facilities (including associated commercial kitchens)
- Taverns and bars

**[W][BG] Assembly Group A-3.** Group A-3 occupancy includes assembly uses intended for worship, recreation or amusement and other assembly uses not classified elsewhere in Group A, including, but not limited to:

- Amusement arcades
- Art galleries more than 3,000 gross square feet (279 m<sup>2</sup>)
- Bowling alleys

## DEFINITIONS

Community halls  
Courtrooms  
Dance halls (not including food or drink consumption)  
Exhibition halls  
Funeral parlors  
Greenhouses with public access for the conservation and exhibition of plants  
Gymnasiums (without spectator seating)  
Indoor swimming pools (without spectator seating)  
Indoor tennis courts (without spectator seating)  
Lecture halls  
Libraries  
Museums  
Places of religious worship  
Pool and billiard parlors  
Waiting areas in transportation terminals

**[BG] Assembly Group A-4.** Group A-4 occupancy includes assembly uses intended for viewing of indoor sporting events and activities with spectator seating including, but not limited to:

Arenas  
Skating rinks  
Swimming pools  
Tennis courts

**[BG] Assembly Group A-5.** Group A-5 occupancy includes assembly uses intended for participation in or viewing outdoor activities including, but not limited to:

Amusement park structures  
*Bleachers*  
Grandstands  
Stadiums

**[BG] Associated with Group E occupancies.** A room or space used for assembly purposes that is associated with a Group E occupancy is not considered a separate occupancy.

**[BG] Small assembly spaces.** The following rooms and spaces shall not be classified as assembly occupancies:

1. A room or space used for assembly purposes with an *occupant load* of less than 50 persons and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.
2. A room or space used for assembly purposes that is less than 750 square feet (70 m<sup>2</sup>) in area and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.

**[BG] Small buildings and tenant spaces.** A building or tenant space used for assembly purposes with an *occupant load* of less than 50 persons shall be classified as a Group B occupancy.

**[BG] Special amusement areas.** Special amusement areas shall comply with Section 411 of the *International Building Code*.

**[S][BG] Group B, Business.** Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Airport traffic control towers  
Ambulatory care facilities  
Animal hospitals, kennels and pounds  
Banks  
Barber and beauty shops  
Car wash  
Civic administration  
Clinic-outpatient

Dry cleaning and laundries: pick-up and delivery stations and self-service  
Educational occupancies for students above the 12th grade, including higher education laboratories  
Electronic data processing  
Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities, and not more than 2,500 square feet (232 m<sup>2</sup>) in area.  
Laboratories: testing and research  
Motor vehicle showrooms  
Post offices  
Print shops  
Professional services (architects, attorneys, dentists, physicians, engineers, etc.)  
Radio and television stations  
Telephone exchanges  
Training and skill development not in a school or academic program (This shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics and similar uses regardless of the ages served, and where not classified as a Group A occupancy).

**[BG] Airport traffic control towers.** Airport traffic control towers shall comply with Section 412.2 of the *International Building Code*.

**[BG] Ambulatory care facilities.** Ambulatory care facilities shall comply with Section 422 of the *International Building Code*.

**[BG] Higher education laboratories.** Higher education laboratories shall comply with Section 428 of the *International Building Code*.

**[BG] Group E, Educational.** Educational Group E occupancy includes, among others, the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12th grade.

**[BG] Accessory to places of religious worship.** Religious educational rooms and religious auditoriums, which are accessory to places of religious worship in accordance with Section 303.1.4 of the *International Building Code* and have *occupant loads* of less than 100 per room or space shall be classified as Group A-3 occupancies.

**[BG] Group E, day care facilities.** This group includes buildings and structures or portions thereof occupied by more than five children older than 2-1/2 years of age who receive educational, supervision or *personal care services* for less than 24 hours per day.

**[BG] Five or fewer children.** A facility having five or fewer children receiving such care shall be classified as part of the primary occupancy.

**[BG] Five or fewer children in a dwelling unit.** A facility such as the above within a *dwelling unit* and having five or fewer children receiving such care shall be classified as a Group R-3 occupancy or shall comply with the *International Residential Code*.

**[BG] Within places of worship.** Rooms and spaces within places of worship providing such care during religious functions shall be classified as part of the primary occupancy.

**[BG] Storm shelters in Group E occupancies.** Storm shelters shall be provided for Group E occupancies where required by Section 423.4 of the *International Building Code*.

**[BG] Group F, Factory Industrial.** Factory Industrial Group F occupancy includes, among others, the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H high-hazard or Group S storage occupancy.

**[S][BG] Factory Industrial F-1 Moderate-hazard occupancy.** Factory industrial uses that are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

- Aircraft (manufacturing, not to include repair)
- Appliances
- Athletic equipment
- Automobiles and other motor vehicles
- Bakeries
- Beverages; over 16-percent alcohol content
- Bicycles

## DEFINITIONS

Boats  
Brooms or brushes  
Business machines  
Cameras and photo equipment  
Canvas or similar fabric  
Carpets and rugs (includes cleaning)  
Clothing  
Construction and agricultural machinery  
Disinfectants  
Dry cleaning and dyeing  
Electric generation plants  
Electronics  
Energy storage systems (ESS) in dedicated-use buildings  
Engines (including rebuilding)  
Food processing and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities, and more than 2,500 square feet (232 m<sup>2</sup>) in area.  
Furniture  
Hemp products  
Jute products  
Laundries  
Leather products  
Machinery  
Metals  
Millwork (sash and door)  
Motion pictures and television filming (without spectators)  
Musical instruments  
Optical goods  
Paper mills or products  
Photographic film  
Plastic products  
Printing or publishing  
Refuse incineration  
Shoes  
Soaps and detergents  
Textiles  
Tobacco  
Trailers  
Upholstering  
Water/sewer treatment facilities  
Wood; distillation  
Woodworking (cabinet)

**[BG] Aircraft manufacturing facilities.** Aircraft manufacturing facilities shall comply with Section 412.6 of the *International Building Code*.

**[BG] Factory Industrial F-2 Low-hazard Occupancy.** Factory industrial uses involving the fabrication or manufacturing of noncombustible materials that, during finishing, packaging or processing do not involve a significant fire hazard, shall be classified as Group F-2 occupancies and shall include, but not be limited to, the following:

Beverages; up to and including 16-percent alcohol content  
Brick and masonry

Ceramic products  
Foundries  
Glass products  
Gypsum  
Ice  
Metal products (fabrication and assembly)

**Group H, High-hazard.** High-hazard Group H occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or *health hazard* in quantities in excess of those allowed in *control areas* complying with Section 5003.8.3, based on the maximum allowable quantity limits for *control areas* set forth in Tables 5003.1.1(1) and 5003.1.1(2). Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this code and the requirements of Section 415 of the *International Building Code*. Hazardous materials stored or used on top of roofs or canopies shall be classified as outdoor storage or use and shall comply with this code.

**High-hazard Group H-1.** Buildings and structures containing materials that pose a *detonation* hazard shall be classified as Group H-1. Such materials shall include, but not be limited to, the following:

Detonable pyrophoric materials  
Explosives:  
    Division 1.1  
    Division 1.2  
    Division 1.3  
    Division 1.4  
    Division 1.5  
    Division 1.6  
Organic peroxides, unclassified detonable  
Oxidizers, Class 4  
Unstable (reactive) materials, Class 3 detonable, and Class 4

**High-hazard Group H-2.** Buildings and structures containing materials that pose a *deflagration* hazard or a hazard from accelerated burning shall be classified as Group H-2. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or *combustible liquids* that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa)  
*Combustible dusts* where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3 of the *International Building Code*  
*Cryogenic fluids*, flammable  
Flammable gases  
Organic peroxides, Class I  
Oxidizers, Class 3, that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa)  
Pyrophoric liquids, solids and gases, nondetonable  
    Unstable (reactive) materials, Class 3, nondetonable  
    Water-reactive materials, Class 3

**High-hazard Group H-3.** Buildings and structures containing materials that readily support combustion or that pose a *physical hazard* shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or *combustible liquids* that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less  
Combustible fibers, other than densely packed baled cotton, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3 of the *International Building Code*  
Consumer fireworks, 1.4G (Class C, Common)  
*Cryogenic fluids*, oxidizing



## DEFINITIONS

Flammable solids

Organic peroxides, Class II and III

Oxidizers, Class 2

Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less

Oxidizing gases

Unstable (reactive) materials, Class 2

Water-reactive materials, Class 2

**High-hazard Group H-4.** Buildings and structures containing materials that are *health hazards* shall be classified as Group H-4. Such materials shall include, but not be limited to, the following:

*Corrosives*

Highly toxic materials

Toxic materials

**High-hazard Group H-5.** Semiconductor fabrication facilities and comparable research and development areas in which hazardous production materials (HPM) are used and the aggregate quantity of materials is in excess of those listed in Tables 5003.1.1(1) and 5003.1.1(2) shall be classified as Group H-5. Such facilities and areas shall be designed and constructed in accordance with Section 415.11 of the *International Building Code*.

**Multiple hazards.** Buildings and structures containing a material or materials representing hazards that are classified in one or more of Groups H-1, H-2, H-3 and H-4 shall conform to the code requirements for each of the occupancies so classified.

**Occupancies containing explosives not classified as H-1.** The following occupancies containing *explosive materials* shall be classified as follows:

1. Division 1.3 *explosive materials* that are used and maintained in a form where either confinement or configuration will not elevate the hazard from a mass fire hazard to mass explosion hazard shall be allowed in Group H-2 occupancies.
2. Articles, including articles packaged for shipment, that are not regulated as a Division 1.4 explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a *detonation* or deflagration between articles shall be allowed in H-3 occupancies.

**Uses other than Group H.** The storage, use or handling of hazardous materials as described in one or more of the following items shall not cause the occupancy to be classified as Group H, but it shall be classified as the occupancy that it most nearly resembles:

1. Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Chapter 24 of this code and Section 416 of the *International Building Code*.
2. Wholesale and retail sales and storage of *flammable* and *combustible liquids* in mercantile occupancies conforming to Chapter 57.
3. Closed piping system containing *flammable* or *combustible liquids* or gases utilized for the operation of machinery or equipment.
4. Cleaning establishments that utilize *combustible liquid* solvents having a *flash point* of 140°F (60°C) or higher in *closed systems* employing equipment *listed* by an *approved testing agency*, provided that this occupancy is separated from all other areas of the building by 1-hour *fire barriers* in accordance with Section 707 of the *International Building Code* or 1-hour *horizontal assemblies* in accordance with Section 711 of the *International Building Code*, or both.
5. Cleaning establishments that utilize a liquid solvent having a *flash point* at or above 200°F (93°C).
6. Liquor stores and distributors without bulk storage.
7. Refrigeration systems.
8. The storage or utilization of materials for agricultural purposes on the premises.
9. Stationary storage battery systems installed in accordance with Section 1207.
10. *Corrosive* personal or household products in their original packaging used in retail display.
11. Commonly used *corrosive* building materials.
12. Buildings and structures occupied for aerosol product storage, aerosol cooking spray products or plastic aerosol 3 products shall be classified as Group S-1, provided that such buildings conform to the requirements of Chapter 51.

13. Display and storage of nonflammable solid and nonflammable or noncombustible liquid hazardous materials in quantities not exceeding the *maximum allowable quantity per control area* in Group M or S occupancies complying with Section 5003.8.3.5.1.
14. The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial explosive devices in Groups B, F, M and S, provided that such storage conforms to the quantity limits and requirements of this code.
15. Stationary fuel cell power systems installed in accordance with this code.
16. *Capacitor energy storage systems* in accordance with this code.
17. Group B higher education laboratory occupancies complying with Section 428 of the *International Building Code* and Chapter 38 of this code.
18. Distilling or brewing of beverages conforming to the requirements of this code.
19. The storage of beer, distilled spirits and wines in barrels and casks conforming to the requirements of this code.

**[BG] Group I, Institutional.** Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which care or supervision is provided to persons who are or are not capable of self-preservation without physical assistance or in which persons are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-1, I-2, I-3 or I-4.

**[W][BG] Institutional Group I-1.** Institutional Group I-1 occupancy shall include buildings, structures or portions thereof for more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised environment and receive custodial care. Buildings of Group I-1 shall be classified as one of the occupancy conditions indicated below and shall comply with Section 420 of the *International Building Code*. This group shall include, but not be limited to, the following:

Alcohol and drug centers

Assisted living facilities licensed under chapter 388-78A WAC and residential treatment facilities licensed under chapter 246-337 WAC shall be classified as Group I-1, Condition 2

Congregate care facilities

Group homes

Halfway houses

Residential board and care facilities

Residential board and custodial care facilities

Social rehabilitation facilities

**[BG] Condition 1.** This occupancy condition shall include buildings in which all persons receiving custodial care who, without any assistance, are capable of responding to an emergency situation to complete building evacuation.

**[BG] Condition 2.** This occupancy condition shall include buildings in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation.

**[BG] Five or fewer persons receiving custodial care.** A facility with five or fewer persons receiving custodial care shall be classified as Group R-3 or shall comply with the *International Residential Code* provided that an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or with Section P2904 of the *International Residential Code*.

**[BG] Six to 16 persons receiving custodial care.** A facility housing not fewer than six and not more than 16 persons receiving custodial care shall be classified as Group R-4.

**[W][BG] Institutional Group I-2.** Institutional Group I-2 occupancy shall include buildings and structures used for medical care on a 24-hour basis for more than five persons who are not capable of self-preservation. This group shall include, but not be limited to, the following:

Foster care facilities

Detoxification facilities

Hospice care centers

Hospitals

Nursing homes

Psychiatric hospitals

**[W][BG] Occupancy Conditions.** Buildings of Group I-2 shall be classified as one of the following occupancy conditions and shall comply with Section 407 of the *International Building Code*:

## DEFINITIONS

**[BG] Condition 1.** This occupancy condition shall include facilities that provide nursing and medical care but do not provide emergency care, surgery, obstetrics, or in-patient stabilization units for psychiatric or detoxification, including, but not limited to, nursing homes and foster care facilities.

**[BG] Condition 2.** This occupancy condition shall include facilities that provide nursing and medical care and could provide emergency care, surgery, obstetrics, or inpatient stabilization units for psychiatric or detoxification, including, but not limited to, hospitals.

**[BG] Five or fewer persons receiving medical care.** A facility with five or fewer persons receiving medical care shall be classified as Group R-3 or shall comply with the *International Residential Code* provided that an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or with Section P2904 of the *International Residential Code*.

**Family home child care.** Family home child care licensed by Washington State for the care of 12 or fewer children shall be classified as Group R-3 or shall comply with the *International Residential Code*.

**Adult care facility.** A facility that provides accommodations for less than 24 hours for more than five unrelated adults and provides supervision and personal care services shall be classified as Group I-4.

**Exception:** Where the occupants are capable of responding to an emergency situation without physical assistance from the staff, the facility shall be classified as Group R-3.

**Child care facility.** Child care facilities that provide supervision and personal care on a less than 24-hour basis for more than five children 2-1/2 years of age or less shall be classified as Group I-4.

### **Exceptions:**

1. A child day care facility that provides care for more than five but no more than 100 children 2-1/2 years or less of age, where the rooms in which the children are cared for are located on a level of exit discharge serving such rooms and each of these child care rooms has an exit door directly to the exterior, shall be classified as Group E.
2. Family child care homes licensed by Washington State for the care of 12 or fewer children shall be classified as Group R-3.

**[BG] Institutional Group I-3.** Institutional Group I-3 occupancy shall include buildings and structures which are inhabited by more than five persons who are under restraint or security. A Group I-3 facility is occupied by persons who are generally incapable of self-preservation due to security measures not under the occupants' control. This group shall include, but not be limited to, the following:

Correctional centers  
Detention centers  
Jails  
Pre-release centers  
Prisons  
Reformatories

Buildings of Group I-3 shall be classified as one of the following occupancy conditions and shall comply with Section 408 of the *International Building Code*:

**[BG] Condition 1.** This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and other spaces where access or occupancy is permitted to the exterior via *means of egress* without restraint. A Condition 1 facility is permitted to be constructed as Group R.

**[BG] Condition 2.** This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and any other occupied *smoke compartment* to one or more other *smoke compartments*. Egress to the exterior is impeded by locked *exits*.

**[BG] Condition 3.** This occupancy condition shall include buildings in which free movement is allowed within individual *smoke compartments*, such as within a residential unit comprised of individual *sleeping units* and group activity spaces, where egress is impeded by remote-controlled release of *means of egress* from such *smoke compartment* to another *smoke compartment*.

**[BG] Condition 4.** This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Remote-controlled release is provided to permit movement from *sleeping units*, activity spaces and other occupied areas within the *smoke compartment* to other *smoke compartments*.

**[BG] Condition 5.** This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Staff-controlled manual release is provided to permit movement from *sleeping units*, activity spaces and other occupied areas within the *smoke compartment* to other *smoke compartments*.

**[BG] Institutional Group I-4, day care facilities.** Institutional Group I-4 shall include buildings and structures occupied by more than five persons of any age who receive custodial care for less than 24 hours by persons other than parents or guardians; relatives by blood, marriage, or adoption; and in a place other than the home of the person cared for. This group shall include, but not be limited to, the following:

- Adult day care
- Child day care

**[BG] Classification as Group E.** A child day care facility that provides care for more than five but not more than 100 children 2-1/2 years or less of age, where the rooms in which the children are cared for are located on a *level of exit discharge* serving such rooms and each of these child care rooms has an *exit* door directly to the exterior, shall be classified as Group E.

**[BG] Five or fewer occupants receiving care in a dwelling unit.** A facility such as the above within a *dwelling unit* and having five or fewer persons receiving custodial care shall be classified as a Group R-3 occupancy or shall comply with the *International Residential Code*.

**[BG] Five or fewer occupants receiving care.** A facility having five or fewer persons receiving custodial care shall be classified as part of the primary occupancy.

**[BG] Within a place of religious worship.** Rooms and spaces within places of religious worship providing such care during religious functions shall be classified as part of the primary occupancy.

**[W][BG] Group M, Mercantile.** Mercantile Group M occupancy includes, among others, the use of a building or structure or a portion thereof, for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purposes and accessible to the public. Mercantile occupancies shall include, but not be limited to, the following:

- Art galleries, 3,000 gross square feet (279 m<sup>2</sup>) or less
- Department stores
- Drug stores
- Greenhouses with public access that maintain plants for display and sale
- Markets
- Motor fuel-dispensing facilities
- Retail or wholesale stores
- Sales rooms

**[BG] Motor fuel-dispensing facilities.** Motor fuel-dispensing facilities shall comply with Section 406.7 of the *International Building Code*.

**[BG] Quantity of hazardous materials.** The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored or displayed in a single control area of a Group M occupancy shall not exceed the quantities in Table 5704.3.4.1.

**[BG] Group R, Residential.** Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the *International Residential Code* in accordance with Section 101.2 of the *International Building Code*. Group R occupancies not constructed in accordance with the *International Residential Code* as permitted by Sections 310.4.1 and 310.4.2 of the *International Building Code* shall comply with Section 420 of the *International Building Code*.

**[BG] Residential Group R-1.** Residential Group R-1 occupancies containing *sleeping units* where the occupants are primarily transient in nature, including:

- Boarding houses* (transient) with more than 10 occupants
- Congregate living facilities (transient) with more than 10 occupants
- Hotels (transient)
- Motels (transient)

**[S][BG] Residential Group R-2.** Residential Group R-2 occupancies containing *sleeping units* or more than two *dwelling units* where the occupants are primarily permanent in nature, including:

- Apartment houses
- Assisted living facilities* licensed by Washington State under Chapter 388-78A WAC
- Congregate living facilities* (nontransient) with more than 16 occupants
  - Boarding houses (nontransient)
  - Convents

## DEFINITIONS

*Dormitories*

Fraternities and sororities

Monasteries

Hotels (nontransient)

~~((Live/work units))~~ Buildings that contain three or more live/work units

Motels (nontransient)

Residential treatment facilities licensed by Washington State under Chapter 246-337 WAC

Vacation timeshare properties

**[S][BG] Residential Group R-3.** Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

Buildings that do not contain more than two *dwelling units*

Buildings that do not contain more than two live/work units

Care facilities that provide accommodations for five or fewer persons receiving care

*Congregate living facilities* (nontransient) with 16 or fewer occupants

Boarding houses (nontransient)

Convents

Dormitories

Fraternities and sororities

Monasteries

*Congregate living facilities (transient)* with 10 or fewer occupants

*Boarding houses (transient)*

*Lodging houses (transient)* with five or fewer *guest-rooms* and 10 or fewer occupants

**[BG] Care facilities within a dwelling.** Care facilities for five or fewer persons receiving care that are within a single-family dwelling are permitted to comply with the *International Residential Code* provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code*.

**[BG] Lodging houses.** Owner-occupied *lodging houses* with five or fewer guestrooms and 10 or fewer total occupants shall be permitted to be constructed in accordance with the *International Residential Code* provided that an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code*.

**[W] Adult family homes, family home child care.** Adult family homes and family home child care facilities that are within a single-family home are permitted to comply with the *International Residential Code*.

**[W] Foster family care homes.** Foster family care homes licensed by Washington State are permitted to comply with the *International Residential Code*, as an accessory use to a dwelling, for six or fewer children including those of the resident family.

**[BG] Residential Group R-4.** Residential Group R-4 shall include buildings, structures or portions thereof for more than five but not more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised residential environment and receive custodial care. Buildings of Group R-4 shall be classified as one of the occupancy conditions indicated below. This group shall include, but not be limited to, the following:

Alcohol and drug centers

Assisted living facilities

Congregate care facilities

Group homes

Halfway houses

Residential board and care facilities

Social rehabilitation facilities

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in the *International Building Code*.

**[BG] Condition 1.** This occupancy condition shall include buildings in which all persons receiving custodial care, without any assistance, are capable of responding to an emergency situation to complete building evacuation.

**[BG] Condition 2.** This occupancy condition shall include buildings in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation.

**[BG] Group S, Storage.** Storage Group S occupancy includes, among others, the use of a building or structure, or a portion thereof, for storage that is not classified as a hazardous occupancy.

**[BG] Group S-1 moderate-hazard storage.** Storage Group S-1 occupancies are buildings occupied for storage uses that are not classified as Group S-2, including, but not limited to, storage of the following:

- Aerosols, Levels 2 and 3
- Aircraft hangar (storage and repair)
- Bags: cloth, burlap and paper
- Bamboos and rattan
- Baskets
- Belting: canvas and leather
- Beverages over 16-percent alcohol content
- Books and paper in rolls or packs
- Boots and shoes
- Buttons, including cloth covered, pearl or bone
- Cardboard and cardboard boxes
- Clothing, woolen wearing apparel
- Cordage
- Dry boat storage (indoor)
- Furniture
- Furs
- Glues, mucilage, pastes and size
- Grains
- Horns and combs, other than celluloid
- Leather
- Linoleum
- Lumber
- Motor vehicle repair garages complying with the maximum allowable quantities of hazardous materials listed in Table 5003.1.1(1) (see Section 406.8 of the *International Building Code*)
- Photo engravings
- Resilient flooring
- Self-service storage facility (mini-storage)
- Silks
- Soaps
- Sugar
- Tires, bulk storage of Tobacco, cigars, cigarettes and snuff
- Upholstery and mattresses
- Wax candles

**[BG] Aircraft hangars.** Aircraft hangars used for storage or repair shall comply with Section 412.3 of the *International Building Code*.

**[BG] Motor vehicle repair garages.** Motor vehicle repair garages shall comply with Section 406.8 of the *International Building Code*.

**[S][BG] Group S-2 low-hazard storage.** Storage Group S-2 occupancies include, among others, buildings used for the storage of noncombustible materials such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such products are permitted to have a negligible amount of plastic trim, such as knobs, handles or film wrapping. Storage uses shall include, but not be limited to, storage of the following:

- Asbestos

## DEFINITIONS

Beverages up to and including 16-percent alcohol  
Cement in bags  
Chalk and crayons  
Covered boat moorage not classified as Group U  
Dairy products in nonwaxed coated paper containers  
Dry cell batteries  
Electrical coils  
Electrical motors  
Empty cans  
Food products  
Foods in noncombustible containers  
Fresh fruits and vegetables in nonplastic trays or containers  
Frozen foods  
Glass  
Glass bottles, empty or filled with noncombustible liquids  
Gypsum board  
Inert pigments  
Ivory  
Meats  
Metal cabinets  
Metal desks with plastic tops and trim  
Metal parts  
Metals  
Mirrors  
Oil-filled and other types of distribution transformers  
Porcelain and pottery  
Public parking garages, open or enclosed  
Stoves  
Talc and soapstones  
Washers and dryers

**[BG] Public parking garages.** Public parking garages shall comply with Section 406.4 of the *International Building Code* and the additional requirements of Section 406.5 of the *International Building Code* for open parking garages or Section 406.6 of the *International Building Code* for enclosed parking garages.

**[BG] Combustible storage.** High-piled stock or rack storage, or attic, under-floor and concealed spaces used for storage of combustible materials, shall be in accordance with Section 413 of the *International Building Code*.

**[BG] Accessory storage spaces.** A room or space used for storage purposes that is accessory to another occupancy shall be classified as part of that occupancy.

**[S][BG] Group U, Miscellaneous.** Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy shall be constructed, equipped and maintained to conform to the requirements of this code commensurate with the fire and life hazard incidental to their occupancy. Group U shall include, but not be limited to, the following:

Agricultural buildings  
Aircraft hangar, accessory to a one- or two-family residence (see Section 412.4 of the *International Building Code*)  
Barns  
Carports  
Communication equipment structures with a gross floor area of less than 1,500 square feet (139 m<sup>2</sup>)  
Covered boat moorage accessory to Group R-3 dwelling unit  
Fences more than 7 feet (2134 mm) in height  
Grain silos, accessory to a residential occupancy

Livestock shelters

Private garages that comply with Section 406 of the *Seattle Building Code*

Retaining walls

Sheds

Stables

Tanks

Towers

**[BG] Private garages and carports.** Private garages and carports shall comply with Section 406.3 of the *International Building Code*.

**[BG] Residential aircraft hangars.** Aircraft hangars accessory to a one- or two-family residence shall comply with Section 412.4 of the *International Building Code*.

**[BG] Greenhouses.** Greenhouses not classified as another occupancy shall be classified as Use Group U.

**[BG] OCCUPANT LOAD.** The number of persons for which the *means of egress* of a building or portion thereof is designed.

**OPEN BURNING.** The burning of materials wherein products of combustion are emitted directly into the ambient air without passing through a stack or chimney from an enclosed chamber. Open burning does not include road flares, smudgepots and similar devices associated with safety or occupational uses typically considered open flames, *recreational fires* or use of portable outdoor fireplaces. For the purpose of this definition, a chamber shall be regarded as enclosed when, during the time combustion occurs, only apertures, ducts, stacks, flues or chimneys necessary to provide combustion air and permit the escape of exhaust gas are open.

**OPEN MALL.** See “*Covered mall building*.”

**OPEN MALL BUILDING.** See “*Covered mall building*.”

**[BG] OPEN PARKING GARAGE.** A structure or portion of a structure with the openings as described in Section 406.5.2 of the *International Building Code* on two or more sides that is used for the parking or storage of private motor vehicles as described in Section 406.5 of the *International Building Code*.

**OPEN SYSTEM.** The use of a solid or liquid hazardous material involving a vessel or system that is continuously open to the atmosphere during normal operations and where vapors are liberated, or the product is exposed to the atmosphere during normal operations. Examples of open systems for solids and liquids include dispensing from or into open beakers or containers, dip tank and plating tank operations.

**OPEN-AIR ASSEMBLY SEATING.** Seating served by *means of egress* that is not subject to smoke accumulation within or under a structure and is open to the atmosphere.

**[BE] OPEN-ENDED CORRIDOR.** An interior *corridor* that is open on each end and connects to an exterior *stairway* or *ramp* at each end with no intervening doors or separation from the *corridor*.

**[BF] OPENING PROTECTIVE.** A *fire door assembly*, fire shutter assembly, fire window assembly or glass-block assembly in a *fire-resistance-rated* wall or partition.

**OPERATING BUILDING.** A building occupied in conjunction with the manufacture, transportation or use of *explosive materials*. Operating buildings are separated from one another with the use of intraplant or intraline distances.

**OPERATING LINE.** A group of buildings, facilities or workstations so arranged as to permit performance of the steps in the manufacture of an *explosive* or in the loading, assembly, modification and maintenance of ammunition or devices containing *explosive materials*.

**OPERATING PRESSURE.** The pressure at which a system operates.

**ORGANIC COATING.** A liquid mixture of binders such as alkyd, nitrocellulose, acrylic or oil, and flammable and combustible solvents such as hydrocarbon, ester, ketone or alcohol, which, when spread in a thin film, convert to a durable protective and decorative finish.

**ORGANIC PEROXIDE.** An organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical. Organic peroxides can present an explosion hazard (*detonation* or *deflagration*) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.

**Class I.** Describes those formulations that are capable of *deflagration* but not *detonation*.

**Class II.** Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard.

**Class III.** Describes those formulations that burn rapidly and that pose a moderate reactivity hazard.



**Class IV.** Describes those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.

**Class V.** Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.

**Unclassified detonable.** Organic peroxides that are capable of *detonation*. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition.

**[S] OUTDOOR ASSEMBLY EVENT.** ~~((An outdoor gathering of persons for any purpose.))~~ A private or public event conducted outdoors, including but not limited to beer gardens and mazes, having a projected attendance of 500 persons or more or confines 100 or more attendees by permanent or temporary installation of barricades or fencing.

**Exception:** Events held at Group R, Division 3 occupancies.

**OUTDOOR CONTROL AREA.** An outdoor area that contains hazardous materials in amounts not exceeding the maximum allowable quantities of Table 5003.1.1(3) or Table 5003.1.1(4).

**OUTPATIENT CLINIC.** See “*Clinic, outpatient.*”

**OVERCROWDING.** A condition that exists when either there are more people in a building, structure or portion thereof than have been authorized or posted by the *fire code official*, or when the *fire code official* determines that a threat exists to the safety of the occupants due to persons sitting and/or standing in locations that may obstruct or impede the use of *aisles*, passages, *corridors*, *stairways*, *exits* or other components of the *means of egress*.

**[A] OWNER.** Any person, agent, operator, entity, firm or corporation having any legal or equitable interest in the property; or recorded in the official records of the state, county or municipality as holding an interest or title to the property; or otherwise having possession or control of the property, including the guardian of the estate of any such person, and the executor or administrator of the estate of such person if ordered to take possession of real property by a court.

**OXIDIZER.** A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.

**Class 4.** An oxidizer that can undergo an explosive reaction due to contamination or exposure to thermal or physical shock and that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.

**Class 3.** An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.

**Class 2.** An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.

**Class 1.** An oxidizer that does not moderately increase the burning rate of combustible materials.

**OXIDIZING CRYOGENIC FLUID.** An oxidizing gas in the cryogenic state.

**OXIDIZING GAS.** A gas that can support and accelerate combustion of other materials more than air does.

**OZONE-GAS GENERATOR.** Equipment which causes the production of ozone.

**[BE] PANIC HARDWARE.** A door-latching assembly incorporating a device that releases the latch upon the application of a force in the direction of egress travel. See also “*Fire exit hardware.*”

**PASSIVE RF EMITTING DEVICE.** A device that does not require an external AC or DC source of power for its operation, and does not provide amplification of the RF signal, including but not limited to coax, couplers, splitters and passive antennas.

**PASS-THROUGH.** An enclosure installed in a wall with a door on each side that allows chemicals, HPM, equipment, and parts to be transferred from one side of the wall to the other.

**[S][BG] PENTHOUSE.** An enclosed, unoccupied rooftop structure used for sheltering mechanical and electrical equipment, tanks, elevators and related machinery, stairways, and vertical shaft openings.

**PERMISSIBLE EXPOSURE LIMIT (PEL).** The maximum permitted 8-hour time-weighted-average concentration of an airborne contaminant. The exposure limits to be utilized are those published in DOL 29 CFR Part 1910.1000. The Recommended Exposure Limit (REL) concentrations published by the US National Institute for Occupational Safety and Health (NIOSH), Threshold Limit Value-Time Weighted Average (TLV-TWA) concentrations published by the American Conference of Governmental Industrial Hygienists (ACGIH), Workplace Environmental Exposure Level (WEEL) Guides published by the American Industrial Hygiene Association (AIHA), and other *approved*, consistent measures are allowed as surrogates for hazardous substances not listed in DOL 29 CFR Part 1910.1000.

**[A] PERMIT.** An official document or certificate issued by the *fire code official* that authorizes performance of a specified activity.

**[S][A] PERSON.** An individual, ~~((heirs, executors, administrators or assigns, and also includes a))~~ receiver, administrator, executor, assignee, trustee in bankruptcy, trust estate, firm, partnership, ~~((or))~~ joint venture, club, company, joint stock company, business trust, municipal corporation, political subdivision of the State of Washington, the State of Washington and any instrumentality thereof, corporation, ~~((its or their successors or assigns, or the agent of any of the aforesaid))~~ limited liability company, association, society or any group of individuals acting as a unit, whether mutual, cooperative, fraternal, nonprofit or otherwise, and the United States or any instrumentality thereof.

**[BG] PERSONAL CARE SERVICE.** The care of persons who do not require medical care. Personal care involves responsibility for the safety of the persons while inside the building.

**PESTICIDE.** A substance or mixture of substances, including fungicides, intended for preventing, destroying, repelling or mitigating pests and substances or a mixture of substances intended for use as a plant regulator, defoliant or desiccant. Products defined as drugs in the Federal Food, Drug and Cosmetic Act are not pesticides.

**[BE] PHOTOLUMINESCENT.** Having the property of emitting light that continues for a length of time after excitation by visible or invisible light has been removed.

**PHYSICAL HAZARD.** A chemical for which there is evidence that it is a *combustible liquid, cryogenic fluid, explosive*, flammable (solid, liquid or gas), organic peroxide (solid or liquid), oxidizer (solid or liquid), oxidizing gas, pyrophoric (solid, liquid or gas), unstable (reactive) material (solid, liquid or gas) or water-reactive material (solid or liquid).

**PHYSIOLOGICAL WARNING THRESHOLD.** A concentration of airborne contaminants, normally expressed in parts per million (ppm) or milligrams per cubic meter (mg/m<sup>3</sup>), that represents the concentration at which persons can sense the presence of the contaminant due to odor, irritation or other quick-acting physiological responses. When used in conjunction with the permissible exposure limit (PEL), the physiological warning threshold levels are those consistent with the classification system used to establish the PEL. See the definition of “*Permissible exposure limit (PEL)*.”

**[S] PIER.** ~~((A structure built over the water, supported by pillars or piles, and used as a landing place, pleasure pavilion or similar purpose.))~~ A structure, usually of greater length than width, of timber, stone, concrete or other material, having a deck and projecting from the shore into waters so that boats may be moored alongside for loading, unloading, storage, repairs or commercial uses.

**PLACE OF RELIGIOUS WORSHIP.** See “*Religious worship, place of*.”

**[M] PLENUM.** An enclosed portion of the building structure, other than an occupiable space being conditioned, that is designed to allow air movement and thereby serve as part of an air distribution system.

**PLOSOPHORIC MATERIAL.** Two or more unmixed, commercially manufactured, prepackaged chemical substances including oxidizers, *flammable liquids* or solids, or similar substances that are not independently classified as *explosives* but which, when mixed or combined, form an *explosive* that is intended for blasting.

**PLYWOOD AND VENEER MILLS.** Facilities where raw wood products are processed into finished wood products, including waferboard, oriented strandboard, fiberboard, composite wood panels and plywood.

**PORTABLE GENERATOR.** A mobile internal combustion engine-driven device that provides temporary electrical power. This includes hand portable, wheeled, trailer mounted, and motor vehicle-mounted generator sets. It does not include generators in permanent, fixed installations.

**PORTABLE OUTDOOR FIREPLACE.** A portable, outdoor, solid-fuel-burning fireplace that may be constructed of steel, concrete, clay or other noncombustible material. A portable outdoor fireplace may be open in design, or may be equipped with a small hearth opening and a short chimney or chimney opening in the top.

**[W] PORTABLE SCHOOL CLASSROOM.** A prefabricated structure consisting of one or more rooms with direct exterior egress from the classroom(s). The structure is transportable in one or more sections, and is designed to be used as an educational space with or without a permanent foundation. The structure shall be capable of being demounted and relocated to other locations as needs arise.

**[BE] POWER-ASSISTED DOOR.** Swinging door that opens by reduced pushing or pulling force on the door-operating hardware. The door closes automatically after the pushing or pulling force is released, and functions with decreased forces. See also “*Low energy power-operated door*” and “*Power-operated door*.”

**POWERED INDUSTRIAL TRUCK.** A forklift, tractor, platform lift truck or motorized hand truck powered by an electrical motor or internal combustion engine. Powered industrial trucks do not include farm vehicles or automotive vehicles for highway use.

**[W] POWERED MICROMOBILITY DEVICES.** Motorized bicycles, motorized scooters, and other personal mobility devices powered by a rechargeable battery. The term does not include motor vehicles that are required to be registered with the department of motor vehicles for the state or jurisdiction.

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**[BE] POWER-OPERATED DOOR.** Swinging, sliding, or folding door that opens automatically when approached by a pedestrian or opens automatically upon an action by a pedestrian. The door closes automatically and includes provisions such as presence sensors to prevent entrapment. See also “*Low energy power-operated door*” and “*Power-assisted door*.”

**PRESSURE VESSEL.** A closed vessel designed to operate at pressures above 15 psig (103 kPa).

**[S] PREVENTABLE FIRE ALARM.** Any activation of a fire alarm system that results in notification to the Seattle Fire Department of an event of fire that leads to a response by Seattle Fire Department personnel when no such danger exists. Preventable fire alarm includes all activations when there is no fire, when such activations are caused by mechanical failure or malfunction due to insufficient or improper testing and maintenance, accidental activation, malicious activation, or misuse, by any person, including persons who sell, install, maintain, test, or monitor fire alarm systems. “Preventable fire alarm” does not include activations caused by weather conditions, telephone line problems, water surges, water hammers, or natural disasters.

**PRIMARY CONTAINMENT.** The first level of containment, consisting of the inside portion of that container which comes into immediate contact on its inner surface with the material being contained.

**[BG] PRIVATE GARAGE.** A building or portion of a building in which motor vehicles used by the *owner* or tenants of the building or buildings on the premises are stored or kept, without provisions for repairing or servicing such vehicles for profit.

**PROCESS TRANSFER.** The transfer of *flammable* or *combustible liquids* between tank vehicles or tank cars and process operations. Process operations may include containers, tanks, piping and equipment.

**PROPELLANT.** The liquefied or *compressed gas* in an aerosol container that expels the contents from an aerosol container when the valve is actuated. A propellant is considered flammable if it forms a flammable mixture with air, or if a flame is self-propagating in a mixture with air.

**PROXIMATE AUDIENCE.** An audience closer to pyrotechnic devices than allowed by NFPA 1123.

**[P] PSERN.** The Puget Sound Emergency Radio Network.

**[B] PSYCHIATRIC HOSPITALS.** See “*Hospitals and psychiatric hospitals*.”

**[P] PUBLIC NUISANCE.** A public nuisance is one which affects equally the rights of an entire community or neighborhood, although the extent of the damage may be unequal. See RCW 7.48.130.

**PUBLIC TRAFFIC ROUTE (PTR).** Any public street, road, highway, navigable stream or passenger railroad that is used for through traffic by the general public.

**[A] PUBLIC WAY.** A street, alley or other parcel of land open to the outside air leading to a street, that has been deeded, dedicated or otherwise permanently appropriated to the public for public use and which has a clear width and height of not less than 10 feet (3048 mm).

**[BE] PUBLIC-USE AREAS.** Interior or exterior rooms or spaces that are made available to the general public.

**PYROPHORIC.** A chemical with an autoignition temperature in air, at or below a temperature of 130°F (54°C).

**PYROTECHNIC ARTICLE.** A pyrotechnic device for use in the entertainment industry, which is not classified as fireworks.

**PYROTECHNIC COMPOSITION.** A chemical mixture that produces visible light displays or sounds through a self-propagating, heat-releasing chemical reaction which is initiated by ignition.

**PYROTECHNIC SPECIAL EFFECT.** A visible or audible effect for entertainment created through the use of pyrotechnic materials and devices.

**PYROTECHNIC SPECIAL-EFFECT MATERIAL.** A chemical mixture used in the entertainment industry to produce visible or audible effects by combustion, *deflagration* or *detonation*. Such a chemical mixture predominantly consists of solids capable of producing a controlled, self-sustaining and self-contained exothermic chemical reaction that results in heat, gas sound, light or a combination of these effects. The chemical reaction functions without external oxygen.

**PYROTECHNICS.** Controlled exothermic chemical reactions timed to create the effects of heat, hot gas, sound, dispersion of aerosols, emission of visible light or a combination of such effects to achieve the maximum effect from the least volume of pyrotechnic composition.

**QUANTITY-DISTANCE (Q-D).** The quantity of *explosive material* and separation distance relationships providing protection. These relationships are based on levels of risk considered acceptable for the stipulated exposures and are tabulated in the appropriate Q-D tables. The separation distances specified afford less than absolute safety:

**Inhabited building distance (IBD).** The minimum separation distance between an operating building or magazine containing *explosive materials* and an inhabited building or site boundary.

**Intermagazine distance (IMD).** The minimum separation distance between magazines.

**Intraline distance (ILD) or Intraplant distance (IPD).** The distance to be maintained between any two operating buildings on an *explosives* manufacturing site when at least one contains or is designed to contain *explosives*, or the distance between a magazine and an operating building.

**RADIO FREQUENCY (RF).** A measurement representing the oscillation rate of the electromagnetic radiation spectrum, or electromagnetic radio waves, from public safety frequency bands as specified by the *fire code official*.

**RAILWAY.** A steam, electric or other railroad or railway that carries passengers for hire.

**[BE] RAMP.** A walking surface that has a running slope steeper than 1 unit vertical in 20 units horizontal (5-percent slope).

**RAMP, EXIT ACCESS.** See “*Exit access ramp.*”

**RAMP, EXTERIOR EXIT.** See “*Exterior exit ramp.*”

**RAMP, INTERIOR EXIT.** See “*Interior exit ramp.*”

**RAW PRODUCT.** A mixture of natural materials such as tree, brush trimmings, or waste logs and stumps.

**[M] READY ACCESS (TO).** That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see “*Access (to)*”].

**READY BOX.** A weather-resistant container with a self-closing or automatic-closing cover that protects fireworks shells from burning debris. Tarpaulins shall not be considered as ready boxes.

**[W] RECALL SIGNAL.** An electrically or mechanically operated signal used to recall occupants after an emergency drill or to terminate a shelter-in-place event that shall be distinct from any alarm or alert signal used to initiate an emergency plan, or other signals.

**[A] RECORD DRAWINGS.** Drawings (“as built”) that document the location of all devices, appliances, wiring, sequences, wiring methods and connections of the components of a fire alarm system as installed.

**RECREATIONAL FIRE.** An outdoor fire burning materials other than rubbish where the fuel being burned is not contained in an incinerator, outdoor fireplace, portable outdoor fireplace, barbecue grill or barbecue pit and has a total fuel area of 3 feet (914 mm) or less in diameter and 2 feet (610 mm) or less in height for pleasure, religious, ceremonial, cooking, warmth or similar purposes.

**REDUCED FLOW VALVE.** A valve equipped with a restricted flow orifice and inserted into a *compressed gas* cylinder, portable tank or stationary tank that is designed to reduce the maximum flow from the valve under full-flow conditions. The maximum flow rate from the valve is determined with the valve allowed to flow to atmosphere with no other piping or fittings attached.

**REFINERY.** A plant in which *flammable* or *combustible liquids* are produced on a commercial scale from crude petroleum, natural gasoline or other hydrocarbon sources.

**REFRIGERANT.** The fluid used for heat transfer in a refrigeration system; the refrigerant absorbs heat and transfers it at a higher temperature and a higher pressure, usually with a change of state.

**[M] REFRIGERATING (REFRIGERATION) SYSTEM.** A combination of interconnected refrigerant-containing parts constituting one closed refrigerant circuit in which a refrigerant is circulated for the purpose of extracting heat.

**[A] REGISTERED DESIGN PROFESSIONAL.** An architect or engineer, registered or licensed to practice professional architecture or engineering, as defined by the statutory requirements of the professional registration laws of the state in which the project is to be constructed.

**[S] REHABILITATION.** Any work, as described by the categories of work defined herein, undertaken in an existing building.

**[BG] RELIGIOUS WORSHIP, PLACE OF.** A building or portion thereof intended for the performance of religious services.

**RELOCATABLE POWER TAP.** A relocatable electrical enclosure that provides one or more receptacle outlets and that is provided with an attached power supply cord and attachment plug for connection to a permanently installed receptacle outlet (also called a “multiplug adaptor”).

**REMOTE EMERGENCY SHUTOFF DEVICE.** The combination of an operator-carried signaling device and a mechanism on the tank vehicle. Activation of the remote emergency shutoff device sends a signal to the tanker-mounted mechanism and causes fuel flow to cease.

**REMOTE SOLVENT RESERVOIR.** A liquid solvent container enclosed against evaporative losses to the atmosphere during periods when the container is not being utilized, except for a solvent return opening not larger than 16 square inches (10 322 mm<sup>2</sup>). Such return allows pump-cycled used solvent to drain back into the reservoir from a separate solvent sink or work area.

**REMOTELY LOCATED, MANUALLY ACTIVATED SHUTDOWN CONTROL.** A control system that is designed to initiate shutdown of the flow of gases or liquids that is manually activated from a point located some distance from the delivery system.

**[S] REPAIR.** The reconstruction or renewal of any part of an existing building for the purposes of its maintenance or to correct damage.

## DEFINITIONS

[S] **REPAIR GARAGE.** ~~((A building, structure or portion thereof used for servicing or repairing motor vehicles.))~~

**Major Repair Garage.** A building or portions of a building where major repairs, such as engine overhauls, painting, body and fender work, and repairs that require draining of the motor vehicle fuel tank are performed on motor vehicles, including associated floor space used for offices, parking, or showrooms.

**Minor Repair Garage.** A building or portions of a building used for lubrication, inspection, and minor automotive maintenance work, such as engine tune-ups, replacement of parts, fluid changes (e.g., oil, antifreeze, transmission fluid, brake fluid, air conditioning refrigerants, etc.), brake system repairs, tire rotation, and similar routine maintenance work, including associated floor space used for offices, parking, or showrooms.

**RESIN APPLICATION AREA.** An area where reinforced plastics are used to manufacture products by hand lay-up or spray-fabrication methods.

**RESPONSIBLE PERSON.** A person trained in the safety and fire safety considerations concerned with hot work. Responsible for reviewing the sites prior to issuing permits as part of the hot work permit program and following up as the job progresses.

**RETAIL DISPLAY AREA.** The area of a Group M occupancy open for the purpose of viewing or purchasing merchandise offered for sale. Individuals in such establishments are free to circulate among the items offered for sale which are typically displayed on shelves, racks or the floor.

**ROLL COATING.** The process of coating, spreading and impregnating fabrics, paper or other materials as they are passed directly through a tank or trough containing *flammable* or *combustible liquids*, or over the surface of a roller revolving partially submerged in a *flammable* or *combustible liquid*.

**RUBBISH (TRASH).** Combustible and noncombustible waste materials, including residue from the burning of coal, wood, coke or other combustible material, paper, rags, cartons, tin cans, metals, mineral matter, glass crockery, dust and discarded refrigerators, and heating, cooking or incinerator-type appliances.

**SAFETY CAN.** An *approved* container of not more than 5-gallon (19 L) capacity having a spring-closing lid and spout cover so designed that it will relieve internal pressure when subjected to fire exposure.

**SAFETY DATA SHEET (SDS).** Information concerning a hazardous material which is prepared in accordance with the provisions of DOL 29 CFR Part 1910.1200 or in accordance with the provisions of a federally *approved* state OSHA plan. A document titled as a Material Safety Data Sheet (MSDS) is equivalent to an SDS for the purposes of this code.

[BE] **SCISSOR STAIRWAY.** Two interlocking *stairways* providing two separate paths of egress located within one *exit* enclosure.

**SECONDARY CONTAINMENT.** That level of containment that is external to and separate from primary containment.

**SEED COTTON.** See “*Cotton*.”

**SEGREGATED.** Storage in the same room or inside area, but physically separated by distance from *incompatible materials*.

[BF] **SELF-CLOSING.** As applied to a fire door or other opening, means equipped with an *approved* device that will ensure closing after having been opened.

[BE] **SELF-LUMINOUS.** Illuminated by a self-contained power source, other than batteries, and operated independently of external power sources.

**SELF-PRESERVATION, INCAPABLE OF.** See “*Incapable of self-preservation*.”

**SELF-SERVICE MOTOR FUEL-DISPENSING FACILITY.** That portion of motor fuel-dispensing facility where liquid motor fuels are dispensed from fixed *approved* dispensing equipment into the fuel tanks of motor vehicles by persons other than a motor fuel-dispensing facility attendant.

**SEMICONDUCTOR FABRICATION FACILITY.** A building or a portion of a building in which electrical circuits or devices are created on solid crystalline substances having electrical conductivity greater than insulators but less than conductors. These circuits or devices are commonly known as semiconductors.

**SERVICE CORRIDOR.** A fully enclosed passage used for transporting HPM and purposes other than required *means of egress*.

**SHELF STORAGE.** Storage on shelves less than 30 inches (762 mm) deep with the distance between shelves not exceeding 3 feet (914 mm) vertically. For other shelving arrangements, see the requirements for rack storage.

[W] **SHELTER-IN-PLACE.** An emergency response used to minimize exposure of facility occupants to chemical or environmental hazards by taking refuge in predetermined interior rooms or areas where actions are taken to isolate the interior environment from the exterior hazard.

[S] **SHIPYARD.** A pier, wharf or series of piers and wharves and related onshore facilities, designated by the *fire code official*, that by virtue of the pier construction, location, emergency vehicle access, fire protection, hydrant availability and on-site safety personnel in accordance with Seattle Fire Department Administrative Rule 26.02.09, *Designated Hot Work Facilities*

and Shipyards and any future revisions of this rule adopted by the fire code official, is suitable to permit repairs, including major conversions, on marine vessels of any length.

**SINGLE-STATION SMOKE ALARM.** An assembly incorporating the detector, the control equipment and the alarm-sounding device in one unit, operated from a power supply either in the unit or obtained at the point of installation.

**[BG] SITE.** A parcel of land bounded by a *lot line* or a designated portion of a public right-of-way.

**SITE SAFETY PLAN.** A plan developed to establish a fire prevention program at a construction site.

**[BG] SITE-FABRICATED STRETCH SYSTEM.** A system, fabricated on site and intended for acoustical, tackable or aesthetic purposes, that is composed of three elements:

1. A frame constructed of plastic, wood, metal or other material used to hold fabric in place.
2. A core material (infill, with the correct properties for the application).
3. An outside layer, comprised of a textile, fabric or vinyl, that is stretched taut and held in place by tension or mechanical fasteners via the frame.

**SKY LANTERN.** An unmanned device with a fuel source that incorporates an open flame in order to make the device airborne.

**[BG] SLEEPING UNIT.** A single unit providing rooms or spaces for one or more persons that includes permanent provisions for sleeping and can include provisions for living, eating and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a *dwelling unit* are not *sleeping units*.

**[S] SLIP.** A berthing place between or adjacent to piers, wharves, or docks: the water areas associated with boat moorage.

**SMALL ARMS AMMUNITION.** A shotgun, rifle or pistol cartridge and any cartridge for propellant-actuated devices. This definition does not include military ammunition containing bursting charges or incendiary, trace, spotting or pyrotechnic projectiles.

**SMALL ARMS PRIMERS.** Small percussion-sensitive *explosive* charges, encased in a cap, used to ignite propellant powder.

**SMOKE ALARM.** A single- or multiple-station alarm responsive to smoke. See also “*Single-station smoke alarm*” and “*Multiple-station smoke alarm*.”

**[BF] SMOKE BARRIER.** A continuous membrane, either vertical or horizontal, such as a wall, floor, or ceiling assembly, that is designed and constructed to restrict the movement of smoke.

**[BG] SMOKE COMPARTMENT.** A space within a building separated from other interior areas of the building by *smoke barriers*, including interior walls and *horizontal assemblies*.

**[BF] SMOKE DAMPER.** A *listed* device installed in ducts and air transfer openings designed to resist the passage of smoke. The device is installed to operate automatically, controlled by a smoke detection system, and where required, is capable of being positioned from a *fire command center*.

**SMOKE DETECTOR.** A *listed* device that senses visible or invisible particles of combustion.

**SMOKE PARTITION.** A wall assembly that extends from the top of the foundation or floor below to the underside of the floor or roof sheathing, deck or slab above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke.

**[BG] SMOKE-DEVELOPED INDEX.** A comparative measure, expressed as a dimensionless number, derived from measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84.

**SMOKELESS PROPELLANTS.** Solid propellants, commonly referred to as smokeless powders, used in small arms ammunition, cannons, rockets, propellant-actuated devices and similar articles.

~~**[S] (([BF] SMOKEPROOF ENCLOSURE.** An *interior exit stairway* designed and constructed so that the movement of the products of combustion produced by a fire occurring in any part of the building into the enclosure is limited.))~~

**[BE] SMOKE-PROTECTED ASSEMBLY SEATING.** Seating served by means of egress that is not subject to smoke accumulation within or under a structure for a specified design time by means of passive design or by mechanical ventilation.

**SOLID.** A material that has a melting point and decomposes or sublimates at a temperature greater than 68°F (20°C).

**SOLID BIOFUEL.** Densified biomass made in the form of cubiform, polyhedral, polyhydric or cylindrical units, produced by compressing milled biomass.

**SOLID BIOMASS FEEDSTOCK.** The basic materials of which solid biofuel is composed, manufactured or made.

**SOLID SHELVING.** Shelving that is solid, slatted or of other construction located in racks and which obstructs sprinkler discharge down into the racks.

**SOLVENT DISTILLATION UNIT.** An appliance that receives contaminated *flammable* or *combustible liquids* and which distills the contents to remove contaminants and recover the solvents.

## DEFINITIONS

**SOLVENT OR LIQUID CLASSIFICATIONS.** A method for classifying solvents or liquids according to the following classes:

**Class I solvents.** Liquids having a *flash point* below 100°F (38°C).

**Class II solvents.** Liquids having a *flash point* at or above 100°F (38°C) and below 140°F (60°C).

**Class IIIA solvents.** Liquids having a *flash point* at or above 140°F (60°C) and below 200°F (93°C).

**Class IIIB solvents.** Liquids having a *flash point* at or above 200°F (93°C).

**Class IV solvents.** Liquids classified as nonflammable.

**SPECIAL AMUSEMENT BUILDING.** A building that is temporary, permanent or mobile that contains a device or system that conveys passengers or provides a walkway along, around or over a course in any direction as a form of amusement arranged so that the egress path is not readily apparent due to visual or audio distractions or an intentionally confounded egress path, or is not readily available because of the mode of conveyance through the building or structure.

**[A] SPECIAL EXPERT.** An individual who has demonstrated qualifications in a specific area, outside the practice of architecture or engineering, through education, training and experience.

**[W] SPECIAL HAZARDS SUPPRESSION SYSTEMS.** Wet-chemical systems (NFPA 17A), Dry-chemical systems (NFPA 17), Foam systems (NFPA 11), Carbon dioxide systems (NFPA 12), Halon systems (NFPA 12A), Clean-agent systems (NFPA 2001), Automatic water mist systems (NFPA 750), Aerosol fire-extinguishing systems (NFPA 2010), and Explosion prevention systems (NFPA 69).

**SPECIAL INDUSTRIAL EXPLOSIVE DEVICE.** An *explosive* power pack containing an *explosive* charge in the form of a cartridge or construction device. The term includes but is not limited to *explosive* rivets, *explosive* bolts, *explosive* charges for driving pins or studs, cartridges for *explosive*-actuated power tools and charges of *explosives* used in automotive air bag inflators, jet tapping of open hearth furnaces and jet perforation of oil well casings.

**SPRAY BOOTH.** A mechanically ventilated appliance of varying dimensions and construction provided to enclose or accommodate a spraying operation and to confine and limit the escape of spray vapor and residue and to exhaust it safely.

**SPRAY ROOM.** A room designed to accommodate spraying operations, constructed in accordance with the *International Building Code*.

**SPRAYING SPACE.** An area in which dangerous quantities of flammable vapors or combustible residues, dusts or deposits are present due to the operation of spraying processes. The *fire code official* is authorized to define the limits of the spraying space in any specific case.

**[W] STAGED EVACUATION.** A method of emergency response that engages building components and trained staff to provide occupant safety during an emergency. Emergency response involves moving or holding certain occupants at temporary locations for a brief period of time before evacuating the building. This response is used by ambulatory surgery facility and assisted living facilities to protect the health and safety of fragile occupants and residents.

**[BE] STAIR.** A change in elevation, consisting of one or more risers.

**[BE] STAIRWAY.** One or more *flights* of *stairs*, either exterior or interior, with the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one level to another.

**STAIRWAY, EXIT ACCESS.** See “*Exit access stairway.*”

**STAIRWAY, EXTERIOR EXIT.** See “*Exterior exit stairway.*”

**STAIRWAY, INTERIOR EXIT.** See “*Interior exit stairway.*”

**STAIRWAY, SCISSOR.** See “*Scissor stairway.*”

**[BE] STAIRWAY, SPIRAL.** A *stairway* having a closed circular form in its plan view with uniform section-shaped treads attached to and radiating from a minimum-diameter supporting column.

**[S] STANDBY FIRE PERSONNEL.** Uniformed employees of the Seattle Fire Department.

**STANDBY POWER SYSTEM.** A source of automatic electric power of a required capacity and duration to operate required building, hazardous materials or ventilation systems in the event of a failure of the primary power. Standby power systems are required for electrical loads where interruption of the primary power could create hazards or hamper rescue or fire-fighting operations.

**[S] STANDBY POWER SYSTEM, LEGALLY REQUIRED.** An electrical power system that complies with *Seattle Electrical Code* Article 701, Legally Required Standby Systems.

**STANDPIPE, TYPES OF.** Standpipe types are as follows:

**Automatic dry.** A dry standpipe system, normally filled with pressurized air, that is arranged through the use of a device, such as a dry pipe valve, to admit water into the system piping automatically upon the opening of a hose valve. The water supply for an automatic dry standpipe system shall be capable of supplying the system demand.

**Automatic wet.** A wet standpipe system that has a water supply that is capable of supplying the system demand automatically.

**Manual dry.** A dry standpipe system that does not have a permanent water supply attached to the system. Manual dry standpipe systems require water from a fire department pumper to be pumped into the system through the fire department connection in order to supply the system demand.

**Manual wet.** A wet standpipe system connected to a water supply for the purpose of maintaining water within the system but which does not have a water supply capable of delivering the system demand attached to the system. Manual wet standpipe systems require water from a fire department pumper (or the like) to be pumped into the system in order to supply the system demand.

**Semiautomatic dry.** A dry standpipe system that is arranged through the use of a device, such as a deluge valve, to admit water into the system piping upon activation of a remote control device located at a hose connection. A remote control activation device shall be provided at each hose connection. The water supply for a semiautomatic dry standpipe system shall be capable of supplying the system demand.

**STANDPIPE SYSTEM, CLASSES OF.** Standpipe system classes are as follows:

**Class I system.** A system providing 2-1/2-inch (64 mm) hose connections to supply water for use by fire departments and those trained in handling heavy fire streams.

**Class II system.** A system providing 1-1/2-inch (38 mm) hose stations to supply water for use primarily by the building occupants or by the fire department during initial response.

**Class III system.** A system providing 1-1/2-inch (38 mm) hose stations to supply water for use by building occupants and 2-1/2-inch (64 mm) hose connections to supply a larger volume of water for use by fire departments and those trained in handling heavy fire streams.

**STATIC PILES.** Piles in which processed wood product or solid biomass feedstock is mounded and is not being turned or moved.

**STEEL.** Hot- or cold-rolled as defined by the *International Building Code*.

**STORAGE, HAZARDOUS MATERIALS.** The keeping, retention or leaving of hazardous materials in closed containers, tanks, cylinders, or similar vessels; or vessels supplying operations through closed connections to the vessel.

**[S][BG] STORY.** That portion of a building, ~~((included))~~ including basements located between the upper surface of a floor and the upper surface of the next floor or roof (~~((next))~~) above (see “Basement,” “Building height,” “Grade plane” and “Mezzanine”). A story is measured as the vertical distance from top to top of two successive tiers of beams or finished floor surfaces and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.

**[S][BG] STORY ABOVE GRADE PLANE.** Any story having its finished floor surface entirely above *grade plane*, or in which the finished surface of the next floor (~~((next))~~) above is:

1. More than 6 feet (1829 mm) above *grade plane*; or
2. More than 12 feet (3658 mm) above the finished ground level (~~((at any point))~~) for more than 25 feet (7620 mm) of the perimeter. Required driveways up to 22 feet (6706 mm) wide shall not be considered in calculating the 25-foot (7620 mm) distance if there are at least 10 feet (3048 mm) between the driveway and all portions of the 25-foot (7620 mm) area.

**SUBORDINATE (FIRE PROTECTION AND LIFE SAFETY SYSTEM).** A system that is activated by another fire protection or life safety system. For example, where a fire alarm system activates a smoke removal or elevator recall system, the smoke removal or elevator recall system is considered to be “subordinate” to the fire alarm system.

**[S] SUBSTANTIAL ALTERATION.** See Section 303.1.1 of the *Seattle Existing Building Code*.

**[S] SUBSTRUCTURE.** The portion of the construction below and including the deck immediately above the water.

**[S] SUPERSTRUCTURE.** The portion of construction above the deck.

**Exception:** Covered boat moorage.

**SUPERVISING STATION.** A facility that receives signals and at which personnel are in attendance at all times to respond to these signals.



## DEFINITIONS

**SUPERVISORY SERVICE.** The service required to monitor performance of guard tours and the operative condition of fire protection systems or other systems for the protection of life and property.

**SUPERVISORY SIGNAL.** A signal indicating the need of action in connection with the supervision of guard tours, the fire protection systems or equipment, or the maintenance features of related systems.

**SUPERVISORY SIGNAL-INITIATING DEVICE.** An initiating device such as a valve supervisory switch, water level indicator, or low-air pressure switch on a dry-pipe sprinkler system whose change of state signals an off-normal condition and its restoration to normal of a *fire protection* or life safety system; or a need for action in connection with guard tours, fire protection systems or equipment, or maintenance features of related systems.

**SYSTEM.** An assembly of equipment consisting of a tank, container or containers, appurtenances, pumps, compressors and connecting piping.

**TANK.** A vessel containing more than 60 gallons (227 L).

**TANK, ATMOSPHERIC.** A storage tank designed to operate at pressures from atmospheric through 1.0 pound per square inch gauge (760 mm Hg through 812 mm Hg) measured at the top of the tank.

**TANK, MOTOR VEHICLE FUEL.** A tank permanently mounted on a motor vehicle to store a gas or liquid fuel that is used for propulsion.

**TANK, PORTABLE.** A packaging of more than 60-gallon (227 L) capacity and designed primarily to be loaded into or on or temporarily attached to a transport vehicle or ship and equipped with skids, mountings or accessories to facilitate handling of the tank by mechanical means. It does not include any cylinder having less than a 1,000-pound (454 kg) water capacity, cargo tank, tank car tank or trailers carrying cylinders of more than 1,000-pound (454 kg) water capacity.

**TANK, PRIMARY.** A *listed* atmospheric tank used to store liquid. See “*Primary containment.*”

**TANK, PROTECTED ABOVE GROUND.** A tank *listed* in accordance with UL 2085 consisting of a primary tank provided with protection from physical damage and fire-resistive protection from a high-intensity liquid pool fire exposure. The tank may provide protection elements as a unit or may be an assembly of components, or a combination thereof.

**TANK, STATIONARY.** Packaging designed primarily for stationary installations not intended for loading, unloading or attachment to a transport vehicle as part of its normal operation in the process of use. It does not include cylinders having less than a 1,000-pound (454 kg) water capacity.

**TANK VEHICLE.** A vehicle other than a railroad tank car or boat, with a cargo tank mounted thereon or built as an integral part thereof, used for the transportation of *flammable* or *combustible liquids*, LP-gas or hazardous chemicals. Tank vehicles include self-propelled vehicles and full trailers and semitrailers, with or without motive power, and carrying part or all of the load.

**TEMPORARY SPECIAL EVENT STRUCTURE.** Any temporary ground-supported structure, platform, stage, stage scaffolding or rigging, canopy, tower supporting audio or visual effects equipment or similar structures not regulated within the scope of the *International Building Code*.

**TENT.** A structure, enclosure, umbrella structure or shelter, with or without sidewalls or drops, constructed of fabric or pliable material supported in any manner except by air or the contents it protects (see “*Umbrella structure.*”).

**THEFT RESISTANT.** Construction designed to deter illegal entry into facilities for the storage of *explosive materials*.

**[S] THERMIT WELDING.** A welding method that employs molten metal to permanently join the conductors. The process employs an exothermic reaction of a thermite composition to heat the metal, and requires no external source of heat or current. The chemical reaction that produces the heat is an aluminothermic reaction between aluminum powder and a metal oxide.

**[BF] THROUGH-PENETRATION FIRESTOP SYSTEM.** An assemblage consisting of a *fire-resistance-rated* floor, floor-ceiling or wall assembly, one or more penetrating items passing through the breaches in both sides of the assembly and the materials or devices, or both, installed to resist the spread of fire through the assembly for a prescribed period of time.

**TIMBER AND LUMBER PRODUCTION FACILITIES.** Facilities where raw wood products are processed into finished wood products.

**TIRES, BULK STORAGE OF.** Storage of tires where the area available for storage exceeds 20,000 cubic feet (566 m<sup>3</sup>).

**TOOL.** A device, storage container, workstation or process machine used in a *fabrication area*.

**TORCH-APPLIED ROOF SYSTEM.** Bituminous roofing systems using membranes that are adhered by heating with a torch and melting asphalt back coating instead of mopping hot asphalt for adhesion.

**[S][A] TOWNHOUSE.** A ~~((single family dwelling unit constructed in a group of))~~ building that contains three or more attached townhouse units, ((in which each unit extends from the foundation to roof and with open space on not less than two sides.))

**TOWNHOUSE UNIT.** A single-family dwelling unit in a townhouse that extends from foundation to roof and that has a yard or public way on not less than two sides that extends at least 50 percent of the length of each of these two sides.

**TOXIC.** A chemical falling within any of the following categories:

1. A chemical that has a median lethal dose (LD<sub>50</sub>) of more than 50 milligrams per kilogram, but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
2. A chemical that has a median lethal dose (LD<sub>50</sub>) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.
3. A chemical that has a median lethal concentration (LC<sub>50</sub>) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than 2 milligrams per liter but not more than 20 milligrams per liter of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

**TRAFFIC CALMING DEVICES.** Traffic calming devices are design elements of fire apparatus access roads such as street alignment, installation of barriers, and other physical measures intended to reduce traffic and cut-through volumes, and slow vehicle speeds.

**[BG] TRANSIENT.** Occupancy of a *dwelling unit* or *sleeping unit* for not more than 30 days.

**[BG] TRANSIENT AIRCRAFT.** Aircraft based at another location and that is at the transient location for not more than 90 days.

**TRANSVERSE FLUE SPACE.** See “*Flue spaces—Transverse.*”

**TRASH.** See “*Rubbish (trash).*”

**TROUBLE SIGNAL.** A signal initiated by the fire alarm system or device indicative of a fault in a monitored circuit or component.

**TUBE TRAILER.** A semitrailer on which a number of tubular gas cylinders have been mounted. A manifold is typically provided that connects the cylinder valves enabling gas to be discharged from one or more tubes or cylinders through a piping and control system.

**TWENTY-FOUR-HOUR BASIS.** See “*24-hour basis*” before the “A” entries.

**UMBRELLA STRUCTURE.** A structure, enclosure or shelter with or without sidewalls or drops, constructed of fabric or pliable material supported by a central pole or poles (see “*Tent*”).

**UNAUTHORIZED DISCHARGE.** A release or emission of materials in a manner which does not conform to the provisions of this code or applicable public health and safety regulations.

**[SI] UNSAFE.** Structurally unsound, provided with inadequate egress, constituting a fire hazard, or otherwise dangerous to human life, or constituting a hazard to safety, health or public welfare.

**UNSTABLE (REACTIVE) MATERIAL.** A material, other than an *explosive*, which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor, or in the presence of contaminants, or in contact with *incompatible materials*. Unstable (reactive) materials are subdivided as follows:

**Class 4.** Materials that in themselves are readily capable of *detonation* or *explosive* decomposition or *explosive* reaction at *normal temperature and pressure*. This class includes materials that are sensitive to mechanical or localized thermal shock at *normal temperature and pressure*.

**Class 3.** Materials that in themselves are capable of *detonation* or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures.

**Class 2.** Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at *normal temperature and pressure*, and that can undergo violent chemical change at elevated temperature and pressure.

**Class 1.** Materials that in themselves are normally stable but which can become unstable at elevated temperature and pressure.

**UNWANTED FIRE.** A fire not used for cooking, heating or recreational purposes or one not incidental to the normal operations of the property.

**USE (MATERIAL).** Placing a material into action, including solids, liquids and gases.

**VALET TRASH COLLECTION.** An intermediary service that removes *trash* or recycling materials placed outside of *dwelling units* or *sleeping units* for final collection.

## Part II—General Safety Provisions

### CHAPTER 3 GENERAL REQUIREMENTS

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**User note:**

***About this chapter:** Chapter 3 provides general requirements for asphalt kettles, combustible waste material, ignition sources, motion picture projection rooms and film, open burning, recreational fires, portable outdoor fireplaces, open flames, powered industrial trucks and equipment, smoking, vacant premises, vehicle impact protection, fueled equipment, indoor displays, general storage, outdoor pallet storage, hazards to fire fighters, landscaped roofs, laundry carts, mobile food preparation vehicles, additive manufacturing (3D printing) and artificial combustible vegetation. These are intended to improve premises safety for everyone, including construction workers, tenants, operations and maintenance personnel, and emergency response personnel.*

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#### SECTION 301 GENERAL

**301.1 Scope.** The provisions of this chapter shall govern the occupancy and maintenance of all structures and premises for precautions against fire and the spread of fire and general requirements of fire safety.

**[W][S] 301.2 Permits.** Permits shall be required as set forth in Section 105.5 for the activities or uses regulated by Sections 306, 307, 308, 315, 319, ~~((and))~~ 320, and 322.

#### SECTION 302 DEFINITIONS

**[W][S] 302.1 Definitions.** The following terms are defined in Chapter 2:

**3D PRINTER.**

**ADDITIVE MANUFACTURING.**

**BONFIRE.**

**FLAME EFFECT.**

**HI-BOY.**

**HIGH-VOLTAGE TRANSMISSION LINE.**

**MOBILE FOOD PREPARATION VEHICLE.**

**OPEN BURNING.**

**OUTDOOR ASSEMBLY EVENT.**

**PORTABLE OUTDOOR FIREPLACE.**

**POWERED INDUSTRIAL TRUCK.**

**RECREATIONAL FIRE.**

**SKY LANTERN.**

**VALET TRASH COLLECTION.**

#### SECTION 303 ASPHALT KETTLES

##### **303 Point of Information**

See Section 3305 for asphalt kettle requirements.

**[S] ~~((303.1 Transporting.~~ Asphalt (tar) kettles shall not be transported over any highway, road or street when the heat source for the kettle is operating.**

## GENERAL REQUIREMENTS

**Exception:** Asphalt (tar) kettles in the process of patching road surfaces.

~~303.2 Location.~~ Asphalt (tar) kettles shall not be located within 20 feet (6096 mm) of any combustible material, combustible building surface or any building opening and within a controlled area identified by the use of traffic cones, barriers or other approved means. Asphalt (tar) kettles and pots shall not be utilized inside or on the roof of a building or structure. Roofing kettles and operating asphalt (tar) kettles shall not block *means of egress*, gates, roadways or entrances.

~~303.3 Location of fuel containers.~~ Fuel containers shall be located not less than 10 feet (3048 mm) from the burner.

**Exception:** Containers properly insulated from heat or flame are allowed to be within 2 feet (610 mm) of the burner.

~~303.4 Attendant.~~ An operating kettle shall be attended by not less than one employee knowledgeable of the operations and hazards. The employee shall be within 100 feet (30480 mm) of the kettle and have the kettle within sight. Ladders or similar obstacles shall not form a part of the route between the attendant and the kettle.

~~303.5 Fire extinguishers.~~ There shall be a portable fire extinguisher complying with Section 906 and with a minimum 40 B:C rating within 25 feet (7620 mm) of each asphalt (tar) kettle during the period such kettle is being utilized. Additionally, there shall be one portable fire extinguisher with a minimum 3-A:40 B:C rating on the roof being covered.

~~303.6 Lids.~~ Asphalt (tar) kettles shall be equipped with tight-fitting lids.

~~303.7 Hi-boys.~~ Hi-boys shall be constructed of noncombustible materials. Hi-boys shall be limited to a capacity of 55 gallons (208 L). Fuel sources or heating elements shall not be allowed as part of a hi-boy.

~~303.8 Roofing kettles.~~ Roofing kettles shall be constructed of noncombustible materials.

~~303.9 Fuel containers under air pressure.~~ Fuel containers that operate under air pressure shall not exceed 20 gallons (76 L) in capacity and shall be *approved*.)

## SECTION 304 COMBUSTIBLE WASTE MATERIAL

**304.1 Waste accumulation prohibited.** Combustible waste material creating a fire hazard shall not be allowed to accumulate in buildings or structures or upon premises.

**304.1.1 Valet trash collection.** *Valet trash collection* shall only be permitted where *approved*. The *owner* and *valet trash collection* service provider shall comply with the rules and limitations established by the jurisdiction.

~~((304.1.1))~~ **304.1.2 Waste material.** Accumulations of wastepaper, wood, hay, straw, weeds, litter or combustible or flammable waste or rubbish of any type shall not be permitted to remain on a roof or in any *court*, yard, vacant lot, alley, parking lot, open space, or beneath a grandstand, *bleacher*, pier, wharf, manufactured home, recreational vehicle or other similar structure.

~~((304.1.2))~~ **304.1.3 Vegetation.** Weeds, grass, vines or other growth that is capable of being ignited and endangering property, shall be cut down and removed by the *owner* or occupant of the premises. Vegetation clearance requirements in wildland-urban interface areas shall be in accordance with the *International Wildland-Urban Interface Code*.

~~((304.1.3))~~ **304.1.4 Space underneath seats.** Spaces underneath grandstand and bleacher seats shall be kept free from combustible and flammable materials. Except where enclosed in not less than 1-hour *fire-resistance-rated* construction in accordance with the *International Building Code*.

~~((304.1.3.1))~~ **304.1.4.1 Spaces underneath grandstands and bleachers.** Spaces underneath grandstands and bleachers shall not be occupied or utilized for purposes other than *means of egress* except where equipped with an *automatic sprinkler system* in accordance with Section 903.2.1.5.1, or separated with fire barriers and *horizontal assemblies* in accordance with Section 1030.1.1.1.

**304.2 Storage.** Storage of combustible rubbish shall not produce conditions that will create a nuisance or a hazard to the public health, safety or welfare.

**304.3 Containers.** Combustible rubbish and waste material kept within or near a structure shall be stored in accordance with Sections 304.3.1 through 304.3.4.

**304.3.1 Spontaneous ignition.** Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a *listed* disposal container. Contents of such containers shall be removed and disposed of daily.

[S] **304.3.2 Capacity exceeding 5.33 cubic feet.** Containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m<sup>3</sup>) shall be provided with lids. Containers and lids shall be constructed of noncombustible materials or of combustible materials with a peak rate of heat release not exceeding 300 kW/m<sup>2</sup> where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m<sup>2</sup> in the horizontal orientation.

### Exceptions:

1. Wastebaskets complying with Section 808.

2. Waste accumulated for collection by the City's solid waste utility shall be stored in containers (to include recycling containers) specified in the City's solid waste collection contracts authorized by ordinance.
3. Dumpsters or containers in areas protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1, 903.3.1.2, or 903.3.1.3.

**304.3.3 Capacity exceeding 1.5 cubic yards.** Dumpsters and containers with an individual capacity of 1.5 cubic yards [40.5 cubic feet (1.15 m<sup>3</sup>)] or more shall not be stored in buildings or placed within 5 feet (1524 mm) of combustible walls, openings or combustible roof eave lines.

**Exceptions:**

1. Dumpsters or containers that are placed inside buildings in areas protected by an *approved automatic sprinkler system* installed throughout in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
2. Storage in a structure shall not be prohibited where the structure is of Type I or IIA construction, located not less than 10 feet (3048 mm) from other buildings and used exclusively for dumpster or container storage.
3. Dumpsters or containers that are located adjacent to buildings where the exterior area is protected by an *approved automatic sprinkler system*.

**304.3.4 Capacity of 1 cubic yard or more.** Dumpsters with an individual capacity of 1.0 cubic yard [200 gallons (0.76 m<sup>3</sup>)] or more shall not be stored in buildings or placed within 5 feet (1524 mm) of combustible walls, openings or combustible roof eave lines unless the dumpsters are constructed of noncombustible materials or of combustible materials with a peak rate of heat release not exceeding 300 kW/m<sup>2</sup> where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m<sup>2</sup> in the horizontal orientation.

**Exceptions:**

1. Dumpsters in areas protected by an *approved automatic sprinkler system* installed throughout in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
2. Storage in a structure shall not be prohibited where the structure is of Type I or IIA construction, located not less than 10 feet (3048 mm) from other buildings and used exclusively for dumpster or container storage.

## SECTION 305 IGNITION SOURCES

**305.1 Clearance from ignition sources.** Clearance between ignition sources, such as luminaires, heaters, flame-producing devices and combustible materials, shall be maintained in an *approved* manner.

**305.2 Hot ashes and spontaneous ignition sources.** Hot ashes, cinders, smoldering coals or greasy or oily materials subject to spontaneous ignition shall not be deposited in a combustible receptacle, within 10 feet (3048 mm) of other combustible material including combustible walls and partitions or within 2 feet (610 mm) of openings to buildings.

**Exception:** The minimum required separation distance to other combustible materials shall be 2 feet (610 mm) where the material is deposited in a covered, noncombustible receptacle placed on a noncombustible floor, ground surface or stand.

**305.3 Open-flame warning devices.** Open-flame warning devices shall not be used along an excavation, road, or any place where the dislodgment of such device might permit the device to roll, fall or slide on to any area or land containing combustible material.

**305.4 Deliberate or negligent burning.** It shall be unlawful to deliberately or through negligence set fire to or cause the burning of combustible material in such a manner as to endanger the safety of persons or property.

**305.5 Unwanted fire ignitions.** Acts or processes that have caused repeated ignition of unwanted fires shall be modified to prevent future ignition.

## SECTION 306 MOTION PICTURE PROJECTION ROOMS AND FILM

**306.1 Motion picture projection rooms.** Electric arc, xenon or other light source projection equipment that develops hazardous gases, dust or radiation and the projection of ribbon-type cellulose nitrate film, regardless of the light source used in projection, shall be operated within a motion picture projection room complying with Section 409 of the *International Building Code*.

**306.2 Cellulose nitrate film storage.** Storage of cellulose nitrate film shall be in accordance with NFPA 40.

GENERAL REQUIREMENTS

**SECTION 307**  
**OPEN BURNING, RECREATIONAL FIRES AND PORTABLE OUTDOOR FIREPLACES**

[S] **307.1 General.** A person shall not kindle or maintain or authorize to be kindled or maintained any *open burning*, ~~((unless conducted and approved in accordance with Sections 307.1.1 through 307.5.))~~

**Exception:** *Bonfires* allowed under a permit issued by the *fire code official*.

[S] ~~((307.1.1 Prohibited open burning. *Open burning* shall be prohibited when atmospheric conditions or local circumstances make such fires hazardous.~~

~~**Exception:** Prescribed burning for the purpose of reducing the impact of wildland fire when authorized by the *fire code official*.)~~

[S] **307.2 Permit required.** A permit shall be obtained from the *fire code official* in accordance with Section 105.5 prior to kindling ~~((a fire for recognized silvicultural or range or wildlife management practices, prevention or control of disease or pests, or))~~ a *bonfire*. ~~((Application for such approval shall only be presented by and permits issued to the owner of the land on which the fire is to be kindled.))~~

[W][S] **307.2.1 Authorization.** Where required by state or local law or regulations, ~~((open burning))~~ *bonfires* shall only be permitted with prior approval from the state or local air and water quality management authority, provided that all conditions specified in the authorization are followed. See also WAC 173-425.

[S] **307.3 Extinguishment authority.** Where ~~((open burning))~~ a *bonfire*, recreational fire, or portable outdoor fire place creates or adds to a hazardous situation, or a required permit for ~~((open burning))~~ a *bonfire* has not been obtained, the *fire code official* is authorized to order the extinguishment of the ~~((open burning))~~ burning operation.

[S] **307.4 Location.** The location for ~~((open burning shall be not less than 50 feet (15 240 mm) from any structure, and provisions shall be made to prevent the fire from spreading to within 50 feet (15 240 mm) of any structure))~~ *bonfires*, recreational fires, and *portable outdoor fireplaces* shall be in accordance with Sections 307.4.1 through 307.4.3.

~~((Exceptions:~~

- ~~1. Fires in approved containers that are not less than 15 feet (4572 mm) from a structure.~~
- ~~2. The minimum required distance from a structure shall be 25 feet (7620 mm) where the pile size is 3 feet (914 mm) or less in diameter and 2 feet (610 mm) or less in height.)~~

**307.4.1 Bonfires.** A *bonfire* shall not be conducted within 50 feet (15 240 mm) of a structure or combustible material unless the fire is contained in a barbecue pit. Conditions that could cause a fire to spread within 50 feet (15 240 mm) of a structure shall be eliminated prior to ignition.

[W] **307.4.2 Recreational fires.** *Recreational fires* shall not be conducted within 25 feet (7620 mm) of a structure or combustible material. Conditions that could cause a fire to spread within 25 feet (7620 mm) of a structure shall be eliminated prior to ignition. See also WAC 173-425.

**307.4.3 Portable outdoor fireplaces.** *Portable outdoor fireplaces* shall be used in accordance with the manufacturer's instructions and shall not be operated within 15 feet (3048 mm) of a structure or combustible material.

**Exception:** *Portable outdoor fireplaces* used at one- and two-family *dwellings*.

[S] **307.5 Attendance.** ~~((Open burning, bonfires))~~ *Bonfires*, recreational fires and use of portable outdoor fireplaces shall be constantly attended until the fire is extinguished. Not fewer than one portable fire extinguisher complying with Section 906 with a minimum 4-A rating or other *approved* on-site fire-extinguishing equipment, such as dirt, sand, water barrel, garden hose or water truck, shall be available for immediate utilization.

[S] **307.6 General burning prohibitions.** Trash, yard waste, rubbish, and paper are prohibited as fuel for *bonfires*, recreational fires, and fires in *portable outdoor fireplaces*.

**307.6 Point of Information**

Hazards from *bonfires*, recreational fires, and fires in *portable outdoor fireplaces* may include but are not limited to smoke or odor emissions causing potential for false alarms, medical alarms, hazards to health, and exposure to other structures from fire.

If conducting a *bonfire* or recreational fire or if using an outdoor fireplace, fire extinguishing equipment in accordance with Section 307.5 shall be available for immediate use. For additional regulations and information pertaining to outdoor fires and burning, see chapter 70.94 RCW. Go to [www.pscleanair.org](http://www.pscleanair.org) for information on how to register an air quality complaint with the Puget Sound Clean Air Agency.

See SFD Information Bulletin *Recreational and Cooking Fire Regulations* at [www.seattle.gov/fire](http://www.seattle.gov/fire). For air quality and burn ban status information and regulations contact the Puget Sound Clean Air Agency referenced above.

## SECTION 308 OPEN FLAMES

[S] **308.1 General.** Open flame, open flame devices, flame effects, fire and burning on all premises shall be in accordance with Sections 308.1.1 through 308.4.1 and with other applicable sections of this code.

**308.1.1 Where prohibited.** A person shall not take or utilize an open flame or light in a structure, vessel, boat or other place where highly flammable, combustible or explosive material is utilized or stored. Lighting appliances shall be well-secured in a glass globe and wire mesh cage or a similar *approved* device.

**308.1.2 Throwing or placing sources of ignition.** A person shall not throw or place, or cause to be thrown or placed, a lighted match, cigar, cigarette, matches, or other flaming or glowing substance or object on any surface or article where it can cause an unwanted fire.

**308.1.3 Torches for removing paint.** A person utilizing a torch or other flame-producing device for removing paint from a structure shall provide not less than one portable fire extinguisher complying with Section 906 and with a minimum 4-A rating, two portable fire extinguishers, each with a minimum 2-A rating, or a water hose connected to the water supply on the premises where such burning is done. The person doing the burning shall remain on the premises 1 hour after the torch or flame-producing device is utilized.

[W] **308.1.4 Open-flame cooking devices.** (~~Charcoal burners and other open flame cooking devices shall not be operated on combustible balconies or within 10 feet (3048 mm) of combustible construction.~~) This section is not adopted.

~~((Exceptions:~~

- ~~1. One and two family dwellings.~~
- ~~2. Where buildings, balconies and decks are protected by an automatic sprinkler system.~~
- ~~3. LP-gas cooking devices having LP-gas container with a water capacity not greater than 2-1/2 pounds [nominal 1 pound (0.454 kg) LP-gas capacity].)~~

**308.1.5 Location near combustibles.** Open flames such as from candles, lanterns, kerosene heaters and gas-fired heaters shall not be located on or near decorative material or similar combustible materials.

**308.1.6 Open-flame devices.** Torches and other devices, machines or processes liable to start or cause fire shall not be operated or used in or on wildfire risk areas, except by a permit in accordance with Section 105.5 secured from the *fire code official*.

**Exception:** Use within inhabited premises or designated campsites that are not less than 30 feet (9144 mm) from grass-, grain-, brush- or forest-covered areas.

**308.1.6.1 Signals and markers.** Flame-employing devices, such as lanterns or kerosene road flares, shall not be operated or used as a signal or marker in or on wildfire risk areas.

**Exception:** The proper use of fusees at the scenes of emergencies or as required by standard railroad operating procedures.

**308.1.6.2 Portable fueled open-flame devices.** Portable open-flame devices fueled by flammable or combustible gases or liquids shall be enclosed or installed in such a manner as to prevent the flame from contacting combustible material.

**Exceptions:**

1. LP-gas-fueled devices used for sweating pipe joints or removing paint in accordance with Chapter 61.
2. Cutting and welding operations in accordance with Chapter 35.
3. Torches or flame-producing devices in accordance with Section ~~((308.4))~~ 308.1.3 and 308.1.6.
4. Candles and open-flame decorative devices in accordance with Section 308.3.

[S] **308.1.6.3 Sky lanterns.** A person shall not ignite, release or cause to be released (~~(an untethered)~~) a sky lantern or like device.

[W] **308.1.7 Religious ceremonies.** (~~Where, in the opinion of the fire code official, adequate safeguards have been taken, participants in religious ceremonies are allowed to carry hand held candles.~~) Participants in religious ceremonies shall not be precluded from carrying hand-held candles. (~~Hand held candles shall not be passed from one person to another while lighted.~~) See RCW 19.27.031(3).

[W] **308.1.7.1 Aisles and exits.** Candles shall be prohibited in areas where occupants stand, or in an *aisle* or *exit*.

**Exception:** Candles used in religious ceremonies.

**308.1.8 Flaming food and beverage preparation.** The preparation of flaming foods or beverages in places of assembly and drinking or dining establishments shall be in accordance with Sections 308.1.8.1 through 308.1.8.5.

## GENERAL REQUIREMENTS

**308.1.8.1 Dispensing.** *Flammable or combustible liquids* used in the preparation of flaming foods or beverages shall be dispensed from one of the following:

1. A 1-ounce (29.6 ml) container.
2. A container not exceeding 1-quart (946.5 ml) capacity with a controlled pouring device that will limit the flow to a 1-ounce (29.6 ml) serving.

**308.1.8.2 Containers not in use.** Containers shall be secured to prevent spillage when not in use.

**308.1.8.3 Serving of flaming food.** The serving of flaming foods or beverages shall be done in a safe manner and shall not create high flames. The pouring, ladling or spooning of liquids is restricted to a maximum height of 8 inches (203 mm) above the receiving receptacle.

**308.1.8.4 Location.** Flaming foods or beverages shall be prepared only in the immediate vicinity of the table being serviced. They shall not be transported or carried while burning.

**308.1.8.5 Fire protection.** The person preparing the flaming foods or beverages shall have a wet cloth towel immediately available for use in smothering the flames in the event of an emergency.

**[W] 308.1.9 Decorative open flame tables.** Gas-fired portable or fixed open flame fire tables and fireplaces are required to be provided with *approved* protection devices to prevent occupants from using flame, and from flame being exposed to combustible material. A fire extinguisher shall be located within 75 feet (22 860 mm) of travel distance or as *approved*. Where located indoors, the supply gas valve will be interlocked with building fire alarm and/or fire sprinklers, where provided.

**[S] 308.2 Permits required.** Permits shall be obtained from the *fire code official* in accordance with Section 105.5 prior to engaging in the following activities involving open flame, *open flame devices*, *flame effects*, fire and burning:

1. Use of a torch or flame-producing device to remove paint from a structure.
2. Use of open flame, *open flame devices*, *flame effects*, fire or burning before an audience in connection with Group A, B or E occupancies, covered malls, and outdoor assembly events.
3. Use or operation of torches and other *open flame* devices, machines or processes liable to start or cause fire in or on wildfire risk areas.

**[S] 308.2.1 Financial responsibility.** Before a permit is issued, liability insurance in accordance with Section 105.3.9 shall be obtained.

**[S] 308.3 Group A occupancies.** Open-flames, *open flame* devices, *flame effects* shall not be used in a Group A occupancy.

### Exceptions:

1. Open-flames, *open-flame* devices, *flame effects* are allowed to be used in the following situations, provided that *approved* precautions are taken to prevent ignition of a combustible material or injury to occupants:
  - 1.1. Where necessary for ceremonial or religious purposes in accordance with Section ((308.1.7)) 308.1.6.
  - 1.2. ((On stages and platforms as)) As a necessary part of a performance before an audience in accordance with Section 308.3.2.
  - 1.3. Where candles on tables are securely supported on substantial noncombustible bases and the candle flames are protected.
2. Heat-producing equipment complying with Chapter 6 and the *International Mechanical Code*.
3. Gas lights are allowed to be used provided that adequate precautions satisfactory to the *fire code official* are taken to prevent ignition of combustible materials.

**308.3.1 Open-flame decorative devices.** Open-flame decorative devices shall comply with all of the following restrictions:

1. Class I and Class II liquids and LP-gas shall not be used.
2. Liquid- or solid-fueled lighting devices containing more than 8 ounces (237 ml) of fuel must self-extinguish and not leak fuel at a rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.
3. The device or holder shall be constructed to prevent the spillage of liquid fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) when the device or holder is not in an upright position.
4. The device or holder shall be designed so that it will return to the upright position after being tilted to an angle of 45 degrees (0.79 rad) from vertical.

**Exception:** Devices that self-extinguish if tipped over and do not spill fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.



5. The flame shall be enclosed except where openings on the side are not more than 0.375-inch (9.5 mm) diameter or where openings are on the top and the distance to the top is such that a piece of tissue paper placed on the top will not ignite in 10 seconds.
6. Chimneys shall be made of noncombustible materials and securely attached to the open-flame device.  
**Exception:** A chimney is not required to be attached to any open-flame device that will self-extinguish if the device is tipped over.
7. Fuel canisters shall be safely sealed for storage.
8. Storage and handling of *combustible liquids* shall be in accordance with Chapter 57.
9. Shades, where used, shall be made of noncombustible materials and securely attached to the open-flame device holder or chimney.
10. Candelabras with flame-lighted candles shall be securely fastened in place to prevent overturning, and shall be located away from occupants using the area and away from possible contact with drapes, curtains or other combustibles.

**[S] 308.3.2 ((Theatrical performances)) Performances before an audience.** Where *approved*, open flames, open-flame devices and flame effects used in conjunction with ~~((theatrical))~~ performances before an audience are allowed to be used in venues protected by approved automatic sprinkler systems in accordance with Section 903.3.1.1 and where adequate safety precautions have been taken in accordance with NFPA 160.

**308.4 Group R occupancies.** Open flame, fire and burning in Group R occupancies shall comply with the requirements of Sections 308.1 through 308.1.6.3 and Section 308.4.1.

**308.4.1 Group R-2 dormitories.** Candles, incense and similar open-flame-producing items shall not be allowed in *sleeping units* in Group R-2 dormitory occupancies.

## SECTION 309 POWERED INDUSTRIAL TRUCKS AND EQUIPMENT

**309.1 General.** Powered industrial trucks and similar equipment including, but not limited to, floor scrubbers and floor buffers, shall be operated and maintained in accordance with Sections 309.2 through 309.7.

**309.2 Use in hazardous (classified) locations.** Powered industrial trucks used in areas designated as hazardous (classified) locations in accordance with NFPA 70 shall be *listed* and *labeled* for use in the environment intended in accordance with NFPA 505.

**309.3 Battery chargers.** Battery chargers shall be of an *approved* type. Combustible storage shall be kept not less than 3 feet (915 mm) from battery chargers. Battery charging shall not be conducted in areas open to the public.

**309.4 Ventilation.** Ventilation shall be provided in an *approved* manner in battery-charging areas to prevent a dangerous accumulation of flammable gases.

**309.5 Fire extinguishers.** Battery-charging areas shall be provided with a fire extinguisher complying with Section 906 having a minimum 4-A:20-B:C rating within 20 feet (6096 mm) of the battery charger.

**309.6 Refueling.** Powered industrial trucks using liquid fuel, LP-gas or hydrogen shall be refueled outside of buildings or in areas specifically *approved* for that purpose. Fixed fuel-dispensing equipment and associated fueling operations shall be in accordance with Chapter 23. Other fuel-dispensing equipment and operations, including cylinder exchange for LP-gas-fueled vehicles, shall be in accordance with Chapter 57 for *flammable* and *combustible liquids* or Chapter 61 for LP-gas.

**309.7 Repairs.** Repairs to fuel systems, electrical systems and repairs utilizing open flame or welding shall be done in *approved* locations outside of buildings or in areas specifically *approved* for that purpose.

## SECTION 310 SMOKING

**310.1 General.** The smoking or carrying of a lighted pipe, cigar, cigarette or any other type of smoking paraphernalia or material is prohibited in the areas indicated in Sections 310.2 through 310.8.

**310.2 Prohibited areas.** Smoking shall be prohibited where conditions are such as to make smoking a hazard, and in spaces where flammable or combustible materials are stored or handled.

**Exception:** In Group I-2 occupancies, patients shall be permitted to smoke in designated patient care areas based on the clinical needs of the patient.

## GENERAL REQUIREMENTS

**310.2.1 Group I-2.** In Group I-2 occupancies, smoking shall be prohibited in patient care areas or where oxygen is used, stored or handled.

**310.3 “No Smoking” signs.** The *fire code official* is authorized to order the posting of “No Smoking” signs or the international symbol for no smoking in a conspicuous location in each structure or location in which smoking is prohibited. The content, lettering, size, color and location of required “No Smoking” signs shall be *approved*.

**Exception:** “No Smoking” signs are not required in interior locations of the facility where signs are displayed at all major entrances into the facility.

### **310.3 Point of Information**

See Seattle Municipal Code Chapter 10.64 for requirements for posting “no smoking” signs in public places.

**310.4 Removal of signs prohibited.** A posted “No Smoking” sign shall not be obscured, removed, defaced, mutilated or destroyed.

**310.5 Compliance with “No Smoking” signs.** Smoking shall not be permitted nor shall a person smoke, throw or deposit any lighted or smoldering substance in any place where “No Smoking” signs are posted.

**310.6 Ash trays.** Where smoking is permitted, suitable noncombustible ash trays or match receivers shall be provided on each table and at other appropriate locations. In Group I-2 occupancies, noncombustible metal containers with self-closing covers shall be provided in areas where smoking is permitted.

**310.7 Burning objects.** Lighted matches, cigarettes, cigars or other burning object shall not be discarded in such a manner that could cause ignition of other combustible material.

**310.8 Hazardous environmental conditions.** Where the *fire code official* determines that hazardous environmental conditions necessitate controlled use of smoking materials, the ignition or use of such materials in mountainous, brush-covered or forest-covered areas or other designated areas is prohibited except in *approved* designated smoking areas.

## SECTION 311 VACANT PREMISES

**311.1 General.** Temporarily unoccupied buildings, structures, premises or portions thereof, including tenant spaces, shall be safeguarded and maintained in accordance with Sections 311.1.1 through 311.6.

**[S] 311.1.1 Abandoned premises.** Buildings, structures and premises (~~for which an owner cannot be identified or located by dispatch of a certificate of mailing to the last known or registered address,)~~ which persistently or repeatedly become unprotected or unsecured, which have been occupied by unauthorized persons or for illegal purposes, or which present a danger of structural collapse or fire spread to adjacent properties (~~shall~~) may be considered to be abandoned, declared unsafe and abated by demolition or rehabilitation in accordance with the (~~International Property Maintenance Code~~) Seattle Municipal Code and the *International Building Code*.

**311.1.2 Tenant spaces.** Storage and lease plans required by this code shall be revised and updated to reflect temporary or partial vacancies.

**311.2 Safeguarding vacant premises.** Temporarily unoccupied buildings, structures, premises or portions thereof shall be secured and protected in accordance with Sections 311.2.1 through 311.2.3.

**311.2.1 Security.** Exterior and interior openings open to other tenants or unauthorized persons shall be boarded, locked, blocked or otherwise protected to prevent entry by unauthorized individuals. The *fire code official* is authorized to placard, post signs, erect barrier tape or take similar measures as necessary to secure public safety.

**311.2.2 Fire protection.** Fire protection systems shall be maintained in an operable condition at all times.

### **Exceptions:**

1. Where the premises have been cleared of all combustible materials and debris and, in the opinion of the *fire code official*, the type of construction, *fire separation distance* and security of the premises do not create a fire hazard.
2. Where *approved* by the *fire code official*, buildings that will not be heated and where *fire protection systems* will be exposed to freezing temperatures, fire alarm and *automatic sprinkler systems* are permitted to be placed out of service and standpipes are permitted to be maintained as dry systems (without an automatic water supply), provided that the building does not have contents or storage, and windows, doors and other openings are secured to prohibit entry by unauthorized persons.
3. Where *approved* by the *fire code official*, fire alarm and *automatic sprinkler systems* are permitted to be placed out of service in seasonally occupied buildings: that will not be heated; where fire protection systems will be exposed to freezing temperatures; where *fire areas* do not exceed 12,000 square feet (1115 m<sup>2</sup>); and that do not store motor vehicles or hazardous materials.

**311.2.3 Fire separation.** *Fire-resistance-rated* partitions, *fire barriers* and *fire walls* separating vacant tenant spaces from the remainder of the building shall be maintained. Openings, joints and penetrations in *fire-resistance-rated* assemblies shall be protected in accordance with Chapter 7.

**311.3 Removal of combustibles.** Persons owning, or in charge or control of, a vacant building or portion thereof, shall remove therefrom all accumulations of combustible materials, flammable or combustible waste or rubbish and shall securely lock or otherwise secure doors, windows and other openings to prevent entry by unauthorized persons. The premises shall be maintained clear of waste or hazardous materials.

**Exceptions:**

1. Buildings or portions of buildings undergoing additions, *alterations*, repairs or change of occupancy in accordance with the *International Building Code*, where waste is controlled and removed as required by Section 304.
2. Seasonally occupied buildings.

**311.4 Removal of hazardous materials.** Persons owning or having charge or control of a vacant building containing hazardous materials regulated by Chapter 50 shall comply with the facility closure requirements of Section 5001.6.

**[S] 311.5 Placards.** ~~((Any)) If any~~ vacant or abandoned buildings or structures are determined to be unsafe pursuant to Section 114 relating to structural or interior hazards, ~~((shall be marked as required by))~~ the fire code official shall be authorized to require marking in accordance with Sections 311.5.1 through 311.5.5.

**311.5.1 Placard location.** Placards shall be applied on the front of the structure and be visible from the street. Additional placards shall be applied to the side of each entrance to the structure and on penthouses.

**311.5.2 Placard size and color.** Placards shall be 24 inches by 24 inches (610 mm by 610 mm) minimum in size with a red background, white reflective stripes and a white reflective border. The stripes and border shall have a 2-inch (51 mm) minimum stroke.

**311.5.3 Placard date.** Placards shall bear the date of their application to the building and the date of the most recent inspection.

**311.5.4 Placard symbols.** The design of the placards shall use the following symbols:

1.  This symbol shall mean that the structure had normal structural conditions at the time of marking.
2.  This symbol shall mean that structural or interior hazards exist and interior fire-fighting or rescue operations should be conducted with extreme caution.
3.  This symbol shall mean that structural or interior hazards exist to a degree that consideration should be given to limit fire fighting to exterior operations only, with entry only occurring for known life hazards.
4. Vacant marker hazard identification symbols: The following symbols shall be used to designate known hazards on the vacant building marker. They shall be placed directly above the symbol.
  - 4.1. R/O—Roof open.
  - 4.2. S/M—Stairs, steps and landing missing.
  - 4.3. F/E—Avoid fire escapes.
  - 4.4. H/F—Holes in floor.

**311.5.5 Informational use.** The use of these symbols shall be informational only and shall not in any way limit the discretion of the on-scene incident commander.

**311.6 Unoccupied tenant spaces in mall buildings.** Unoccupied tenant spaces in covered and open mall buildings shall be:

1. Kept free from the storage of any materials.
2. Separated from the remainder of the building by partitions of not less than 0.5-inch-thick (12.7 mm) gypsum board or an *approved* equivalent to the underside of the ceiling of the adjoining tenant spaces.
3. Without doors or other access openings other than one door that shall be kept key locked in the closed position except during that time when opened for inspection.
4. Kept free from combustible waste and be broomswept clean.

## SECTION 312 VEHICLE IMPACT PROTECTION

**312.1 General.** Vehicle impact protection required by this code shall be provided by posts that comply with Section 312.2 or by other *approved* physical barriers that comply with Section 312.3.

## GENERAL REQUIREMENTS

**312.2 Posts.** Guard posts shall comply with all of the following requirements:

1. Constructed of steel not less than 4 inches (102 mm) in diameter and concrete filled.
2. Spaced not more than 4 feet (1219 mm) between posts on center.
3. Set not less than 3 feet (914 mm) deep in a concrete footing of not less than a 15-inch (381 mm) diameter.
4. Set with the top of the posts not less than 3 feet (914 mm) above ground.
5. Located not less than 3 feet (914 mm) from the protected object.

**312.3 Other barriers.** Barriers, other than posts specified in Section 312.2, that are designed to resist, deflect or visually deter vehicular impact commensurate with an anticipated impact scenario shall be permitted where *approved*.

## SECTION 313 FUELED EQUIPMENT

[S] **313.1 General.** Fueled equipment including, but not limited to, vehicles, watercraft, motorcycles, mopeds, lawn-care equipment, portable generators and portable cooking equipment, shall not be stored, operated or repaired within a building.

### Exceptions:

1. Buildings or rooms constructed for such use in accordance with the *International Building Code*.
2. Where allowed by Section 314.
3. Storage of equipment utilized for maintenance purposes is allowed in *approved* locations where the aggregate fuel capacity of the stored equipment does not exceed 10 gallons (38 L) and the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1.

**313.1.1 Removal.** The *fire code official* is authorized to require removal of fueled equipment from locations where the presence of such equipment is determined by the *fire code official* to be hazardous.

**313.2 Group R occupancies.** Vehicles powered by *flammable liquids*, Class II *combustible liquids* or compressed flammable gases shall not be stored within the living space of Group R buildings.

## SECTION 314 INDOOR DISPLAYS

**314.1 General.** Indoor displays constructed within any occupancy shall comply with Sections 314.2 through 314.4.

**314.2 Fixtures and displays.** Fixtures and displays of goods for sale to the public shall be arranged so as to maintain free, immediate and unobstructed access to exits as required by Chapter 10.

**314.3 Highly combustible goods.** The display of highly combustible goods, including but not limited to fireworks, *flammable* or *combustible liquids*, liquefied flammable gases, oxidizing materials, pyroxylin plastics and agricultural goods, in main *exit access aisles*, *corridors*, covered and open malls, or within 5 feet (1524 mm) of entrances to *exits* and exterior exit doors is prohibited where a fire involving such goods would rapidly prevent or obstruct egress.

[W] **314.4 Vehicles.** Liquid-fueled or gaseous-fueled vehicles, aircraft, boats or other motorcraft shall not be located indoors except as follows:

1. The engine starting system is made inoperable or batteries are disconnected except where the *fire code official* requires that the batteries remain connected to maintain safety features.
2. Fuel in fuel tanks does not exceed any of the following:
  - 2.1. Class I, II, and III liquid fuel does not exceed one-quarter tank or 5 gallons (19 L) (whichever is ((least)) less).
  - 2.2. LP gas does not exceed one-quarter tank or 6.6 gallons (25 L), whichever is less.
  - 2.3. CNG does not exceed one-quarter tank or 630 cubic feet (17.8 m<sup>3</sup>), whichever is less.
  - 2.4. Hydrogen does not exceed one-quarter tank or 2,000 cubic feet (0.57 m<sup>3</sup>), whichever is less.
3. Fuel tanks and fill openings are closed and sealed to prevent tampering.
4. Vehicles, aircraft, boats or other motorcraft equipment are not fueled or defueled within the building.

## SECTION 315 GENERAL STORAGE

**315.1 General.** Storage shall be in accordance with Sections 315.2 through 315.6. Outdoor pallet storage shall be in accordance with Sections 315.2 and 315.7.

**Exception:** Wood and wood composite pallets stored outdoors at pallet manufacturing and recycling facilities and complying with Section 2810.

[S] **315.2 Permit required.** A permit for (~~miscellaneous~~) combustible storage shall be required as set forth in Section 105.5.

**315.3 Storage in buildings.** Storage of materials in buildings shall be orderly and stacks shall be stable. Storage of combustible materials shall be separated from heaters or heating devices by distance or shielding so that ignition cannot occur.

**315.3.1 Ceiling clearance.** Storage shall be maintained 2 feet (610 mm) or more below the ceiling in nonsprinklered areas of buildings or not less than 18 inches (457 mm) below sprinkler head deflectors in sprinklered areas of buildings.

**Exceptions:**

1. The 2-foot (610 mm) ceiling clearance is not required for storage along walls in nonsprinklered areas of buildings.
2. The 18-inch (457 mm) ceiling clearance is not required for storage along walls in areas of buildings equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.

**315.3.2 Means of egress.** Combustible materials shall not be stored in *exits* or enclosures for *stairways* and *ramps*. Combustible materials in the *means of egress* during construction, demolition, remodeling or *alterations* shall comply with Section 3312.3.

[S] 315.3.2.1 Storage under stairways. Storage is prohibited under exit stairways.

**Exception:** Enclosures under stairways in accordance with Section 1011.7.

**315.3.3 Equipment rooms.** Combustible material shall not be stored in boiler rooms, mechanical rooms, elevator machine rooms, electrical equipment rooms or in *fire command centers* as specified in Section 508.1.5.

**315.3.4 Attic, under-floor and concealed spaces.** Attic, under-floor and concealed spaces used for storage of combustible materials shall be protected on the storage side as required for 1-hour *fire-resistance-rated* construction. Openings shall be protected by assemblies that are self-closing and are of noncombustible construction or solid wood core not less than 1-3/4 inches (44.5 mm) in thickness. Storage shall not be placed on exposed joists.

**Exceptions:**

1. Areas protected by *approved automatic sprinkler systems*.
2. Group R-3 and Group U occupancies.

[S] 315.3.5 Non high pile storage arrangements. Storage that is not high pile storage shall be within 20 feet (6096 mm) of the two aisles, each at least 44 inches (1118 mm) wide. No block pile shall exceed 40 feet (12 192 mm) by 40 feet (12 192 mm) unless *approved by the fire code official*. No dead-end aisle shall be longer than 10 times the width. All storage in *unsprinklered areas* shall be within 150 feet (45 720 mm) aisle travel of fire department exterior access openings.

**315.4 Outside storage.** Outside storage of combustible materials shall not be located within 10 feet (3048 mm) of a *lot line*.

**Exceptions:**

1. The separation distance is allowed to be reduced to 3 feet (914 mm) for storage not exceeding 6 feet (1829 mm) in height.
2. The separation distance is allowed to be reduced where the *fire code official* determines that hazard to the adjoining property does not exist.

**315.4.1 Storage beneath overhead projections from buildings.** Where buildings are protected by an *automatic sprinkler system*, the outdoor storage, display and handling of combustible materials under eaves, canopies or other projections or overhangs are prohibited except where automatic sprinklers are installed under such eaves, canopies or other projections or overhangs.

[S] **315.4.2 Height.** Storage in the open shall not exceed 20 feet (6096 mm) in height.

**Exception:** Boat storage in accordance with NFPA 303.

[S] 315.4.3 Prohibited locations. Storage shall not be located underneath elevated roadways or elevated railways unless *approved by the fire code official*.

**315.5 Storage underneath high-voltage transmission lines.** Storage located underneath high-voltage transmission lines shall be in accordance with Section 316.6.2.

**315.6 Storage in plenums.** Storage is prohibited in plenums. Abandoned material in plenums shall be deemed to be storage and shall be removed. Where located in plenums, the portion of abandoned cables that are able to be accessed without causing damage, or requiring demolition to the building shall be identified for future use with a tag or shall be deemed storage and shall be removed.

**TABLE 315.7.6(3)**  
**SEPARATION FROM OTHER PALLET PILES AND ON-SITE STORAGE (WOOD PALLETS)**

	WOOD PALLET SEPARATION DISTANCE (feet)		
	≤ 50 Pallets	51 to 200 Pallets	> 200 Pallets
Between pallet piles	7.5	15	45
Other on-site storage	7.5	15	45

For SI: 1 foot = 304.8 mm.

**TABLE 315.7.6(4)**  
**SEPARATION FROM OTHER PALLET PILES AND ON-SITE STORAGE (PLASTIC PALLETS)**

	PLASTIC PALLET SEPARATION DISTANCE (feet)		
	≤ 50 Pallets	51 to 200 Pallets	> 200 Pallets
Between pallet piles	15	40	75
Other on-site storage	15	40	75

For SI: 1 foot = 304.8 mm.

[S] **315.7.7 Prohibited locations.** Pallets shall not be stored underneath high-voltage transmission lines, elevated roadways or elevated railways unless approved by the fire code official.

[S] **315.8 Basement storage and sale of combustible materials.** Storage and sale of combustible material in non-sprinklered basements shall be in accordance with Sections 315.8.1 through 315.8.5.

**315.8.1 Storage room size.** Combustible material being stored or available for sales shall be placed in rooms no larger than 500 square feet (46.5 m<sup>2</sup>).

**315.8.2 Storage room construction.** Each storage room shall be separated from other areas by fire barriers with at least one hour fire-resistance rating.

**315.8.3 Number of storage rooms.** There shall be a maximum of three storage rooms within any one basement.

**315.8.4 Storage room access.** Each storage room shall be provided with access directly from the building exterior, or through a one-hour fire resistance rated corridor between each room and an exterior door, or exit enclosure.

**315.8.5 Storage room restrictions.** Storage rooms shall not contain any material classified as a flammable liquid, hazardous material, or highly combustible material.

## SECTION 316 HAZARDS TO FIRE FIGHTERS

**316.1 Trapdoors to be closed.** Trapdoors and scuttle covers, other than those that are within a *dwelling unit* or automatically operated, shall be kept closed at all times except when in use.

**316.2 Shaftway markings.** Vertical shafts shall be identified as required by this section.

**316.2.1 Exterior access to shaftways.** Outside openings that can be reached by the fire department and that open directly on a hoistway or shaftway communicating between two or more floors in a building shall be plainly marked with the word "SHAFTWAY" in red letters not less than 6 inches (152 mm) high on a white background. Such warning signs shall be placed so as to be readily discernible from the outside of the building.

**316.2.2 Interior access to shaftways.** Door or window openings to a hoistway or shaftway from the interior of the building shall be plainly marked with the word "SHAFTWAY" in red letters not less than 6 inches (152 mm) high on a white background. Such warning signs shall be placed so as to be readily discernible.

**Exception:** Marking shall not be required on shaftway openings that are readily discernible as openings onto a shaftway by the construction or arrangement.

**316.3 Pitfalls.** The intentional design or *alteration* of buildings to disable, injure, maim or kill intruders is prohibited. A person shall not install and use firearms, sharp or pointed objects, razor wire, *explosives*, *flammable* or *combustible liquid* containers, or dispensers containing highly toxic, toxic, irritant or other hazardous materials in a manner that could passively or actively disable, injure, maim or kill a fire fighter who forcibly enters a building for the purpose of controlling or extinguishing a fire, rescuing trapped occupants or rendering other emergency assistance.

**316.4 Obstructions on roofs.** Wires, cables, ropes, antennas, or other suspended obstructions installed on the roof of a building having a roof slope of less than 30 degrees (0.52 rad) shall not create an obstruction that is less than 7 feet (2133 mm) high above the surface of the roof.

## SECTION 319 MOBILE FOOD PREPARATION VEHICLES

[W] **319.1 General.** Mobile food preparation vehicles that are equipped with appliances that produce smoke or grease-laden vapors or utilizing LP-gas systems or CNG systems shall comply with this section.

**319.2 Permit required.** Permits shall be required as set forth in Section 105.5.

**319.3 Exhaust hood.** Cooking equipment that produces grease-laden vapors shall be provided with a kitchen exhaust hood in accordance with Section 606.

**319.4 Fire protection.** Fire protection shall be provided in accordance with Sections 319.4.1 and 319.4.2.

**319.4.1 Fire protection for cooking equipment.** Cooking equipment shall be protected by automatic fire-extinguishing systems in accordance with Section 904.13.

**319.4.2 Fire extinguisher.** Portable fire extinguishers shall be provided in accordance with Section 906.4.

**319.5 Appliance connection to fuel supply piping.** Gas cooking appliances shall be secured in place and connected to fuel-supply piping with an appliance connector complying with ANSI Z21.69/CSA 6.16. The connector installation shall be configured in accordance with the manufacturer's installation instructions. Movement of appliances shall be limited by restraining devices installed in accordance with the connector and appliance manufacturer's instructions.

**319.6 Cooking oil storage containers.** Cooking oil storage containers within mobile food preparation vehicles shall have a maximum aggregate volume not more than 120 gallons (454 L), and shall be stored in such a way as to not be toppled or damaged during transport.

**319.7 Cooking oil storage tanks.** Cooking oil storage tanks within mobile food preparation vehicles shall comply with Sections 319.7.1 through 319.7.5.2.

**319.7.1 Metallic storage tanks.** Metallic cooking oil storage tanks shall be *listed* in accordance with UL 80 or UL 142, and shall be installed in accordance with the tank manufacturer's instructions.

**319.7.2 Nonmetallic storage tanks.** Nonmetallic cooking oil storage tanks shall be installed in accordance with the tank manufacturer's instructions and shall comply with both of the following:

1. Tanks shall be *listed* for use with cooking oil, including maximum temperature to which the tank will be exposed during use.
2. Tank capacity shall not exceed 200 gallons (757 L) per tank.

**319.7.3 Cooking oil storage system components.** Metallic and nonmetallic cooking oil storage system components shall include, but are not limited to, piping, connections, fittings, valves, tubing, hose, pumps, vents and other related components used for the transfer of cooking oil.

**319.7.4 Design criteria.** The design, fabrication and assembly of system components shall be suitable for the working pressures, temperatures and structural stresses to be encountered by the components.

**319.7.5 Tank venting.** Normal and emergency venting shall be provided for cooking oil storage tanks.

**319.7.5.1 Normal vents.** Normal vents shall be located above the maximum normal liquid line, and shall have a minimum effective area not smaller than the largest filling or withdrawal connection. Normal vents are not required to vent to the exterior.

**319.7.5.2 Emergency vents.** Emergency relief vents shall be located above the maximum normal liquid line, and shall be in the form of a device or devices that will relieve excessive internal pressure caused by an exposure fire. For nonmetallic tanks, the emergency relief vent shall be allowed to be in the form of construction. Emergency vents are not required to discharge to the exterior.

**319.8 LP-gas systems.** Where LP-gas systems provide fuel for cooking appliances, such systems shall comply with Chapter 61 and Sections 319.8.1 through 319.8.5.

**319.8.1 Maximum aggregate volume.** The maximum aggregate capacity of LP-gas containers transported on the vehicle and used to fuel cooking appliances only shall not exceed 200 pounds (91 kg) propane capacity.

**319.8.2 Protection of container.** LP-gas containers installed on the vehicle shall be securely mounted and restrained to prevent movement.

**319.8.3 LP-gas container construction.** LP-gas containers shall be manufactured in compliance with the requirements of NFPA 58.

**319.8.4 Protection of system piping.** LP-gas system piping, including valves and fittings, shall be adequately protected to prevent tampering, impact damage, and damage from vibration.

**319.8.5 LP-gas alarms.** A *listed* LP-gas alarm shall be installed within the vehicle in the vicinity of LP-gas system components, in accordance with the manufacturer's instructions.

**320.3 Industrial additive manufacturing.** Industrial additive manufacturing equipment and operations shall comply with Sections 320.3.1 through 320.3.12.

**320.3.1 Permits required.** Permits shall be obtained from the *fire code official* in accordance with Section 105.5 prior to engaging in industrial additive manufacturing operations.

**320.3.2 Listing.** 3D printers used in industrial additive manufacturing shall be *listed* and *labeled* in accordance with UL 2011 or *approved* for the application based on a field evaluation conducted by an *approved* agency.

**320.3.3 Combustible dusts and metals.** Industrial additive manufacturing operations that store, use or produce combustible dust, combustible particulate solids or combustible metals shall comply with Chapter 22 and this section.

**320.3.4 Powder evaluation.** Printing powders used in industrial additive manufacturing operations shall be tested for combustibility in accordance with NFPA 484 or NFPA 652 as applicable. A copy of test reports shall be provided to the *fire code official* upon request.

**320.3.5 Combustible (nonmetallic) dusts.** Industrial additive manufacturing operations that store, use or produce combustible (nonmetallic) dusts shall comply with NFPA 654.

**320.3.6 Combustible metals.** Industrial additive manufacturing operations that store or use combustible metals shall comply with NFPA 484.

**320.3.7 Ancillary equipment.** Ancillary equipment provided for recycling, sieving, vacuuming or handling combustible powders shall be designed and *approved* for such use.

**320.3.8 Hazardous materials.** Industrial additive manufacturing operations that store or use hazardous materials exceeding the maximum allowable quantity limits shall comply with Chapter 50.

**320.3.9 Inert gas.** Additive manufacturing processes that utilize inert gases shall comply with Chapter 53. Ventilation or gas detection shall be provided in accordance with Section 5307.

**320.3.10 Technical assistance.** Where required by the *fire code official*, a report evaluating the acceptability of technologies, processes, products, facilities, materials and uses associated with the operation shall be provided in accordance with Section 104.8.2 and *approved*.

**320.3.11 Performance-based design alternative.** Where *approved* by the *fire code official*, buildings and facilities where industrial additive manufacturing is performed shall be permitted to comply with the performance-based design options in Section 5001.3 as an alternative to compliance with the other requirements set forth in this section.

**320.3.12 Occupancies.** Industrial additive manufacturing shall be conducted only in the occupancy groups associated with manufacturing operation and permitted by the Chapter 50 maximum allowable quantity tables. Where *approved*, the requirements in Section 320.3.6 shall be permitted to provide the technical basis for determining compliance with Table 5003.1.1(1), Note q.

## SECTION 321 ARTIFICIAL COMBUSTIBLE VEGETATION

**[W] 321.1 Artificial combustible vegetation on roofs and near buildings.** Artificial combustible vegetation exceeding 6 feet (1829 mm) in height and permanently installed outdoors within 5 feet (1524 mm) of a building or on the roof of a building shall comply with Section 807.4.1. The placement of artificial combustible vegetation shall also comply with Sections 806.3 and 807.4.2.

### Exceptions:

1. Artificial decorative vegetation located more than 30 feet (9144 mm) from the exterior wall of a building.
2. Artificial decorative vegetation used at structures regulated by the International Residential Code.

## [W][S] SECTION 322 LITHIUM-ION AND LITHIUM METAL BATTERIES

**322.1 General.** The storage of lithium-ion and lithium metal batteries shall comply with Section 322.

### Exceptions:

1. New or refurbished batteries installed in the equipment, devices, or vehicles they are designed to power.
2. New or refurbished batteries packed for use with the equipment, devices, or vehicles they are designed to power.
3. Batteries in original retail packaging that are rated at 300 watt-hours or less for lithium-ion batteries or contain 25 grams or less of lithium metal for lithium metal batteries.



## GENERAL REQUIREMENTS

4. Temporary storage of batteries or battery components during the battery manufacturing process prior to completion of final quality control checks.
5. Temporary storage of batteries during the vehicle manufacturing or repair process.

**322.2 Permits.** Permits shall be required for an accumulation of more than 15 cubic feet (0.42 m<sup>3</sup>) of lithium-ion and lithium metal batteries, other than batteries listed in the exceptions to Section 322.1, as set forth in Section 105.5.32.

**322.3 Fire safety plan.** A fire safety plan shall be provided in accordance with Section 403.10.6. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

**322.4 Storage requirements.** Lithium-ion and lithium metal batteries shall be stored in accordance with Section 322.4.1, 322.4.2, or 322.4.3, as applicable.

**322.4.1 Limited indoor storage in containers.** Not more than 15 cubic feet (0.42 m<sup>3</sup>) of lithium-ion or lithium metal batteries shall be permitted to be stored in containers in accordance with the following:

1. Containers shall be open-top and constructed of noncombustible materials or shall be *approved* for battery collection.
2. Individual containers and groups of containers shall not exceed a capacity of 7.5 cubic feet (0.21 m<sup>3</sup>).
3. A second container or group of containers shall be separated by not less than 3 feet (914 mm) of open space, or 10 feet (3048 mm) of space that contains combustible materials.
4. Containers shall be located not less than 5 feet (1524 mm) from exits or exit access doors.

**322.4.2 Indoor storage areas.** Indoor storage areas for lithium-ion and lithium metal batteries, other than those complying with Section 322.4.1, shall comply with Sections 322.4.2.1 through 322.4.2.6.

**322.4.2.1 Technical opinion and report.** Where required by the *fire code official* a technical opinion and report complying with Section 104.8.2 shall be prepared to evaluate the fire and explosion risks associated with the indoor storage area and to make recommendations for fire and explosion protection. The report shall be submitted to the *fire code official* and shall require the *fire code official's* approval prior to issuance of a permit. In addition to the requirements of Section 104.8.2, the technical opinion and report shall specifically evaluate the following:

1. The potential for deflagration of flammable gases released during a thermal runaway event.
2. The basis of design for an automatic sprinkler system or other *approved* fire suppression system. Such design basis shall reference relevant full-scale fire testing or another *approved* method of demonstrating sufficiency of the recommended design.

**322.4.2.2 Construction requirements.** Where indoor storage areas for lithium-ion and lithium metal batteries are located in a building with other uses, battery storage areas shall be separated from the remainder of the building by 2-hour rated fire barriers or horizontal assemblies. Fire barriers shall be constructed in accordance with Section 707 of the International Building Code, and horizontal assemblies shall be constructed in accordance with Section 711 of the International Building Code.

### **Exceptions:**

1. Where battery storage is contained in one or more *approved* prefabricated portable structures providing a complete two-hour fire resistance rated enclosure, fire barriers and horizontal assemblies are not required.
2. Where battery storage is limited to new batteries in packaging that has been demonstrated to and *approved* by the *fire code official* as sufficient to isolate a fire in packaging to the package interior, fire barriers and horizontal assemblies are not required.

**322.4.2.3 Fire protection systems.** Indoor storage areas for lithium-ion and lithium metal batteries shall be protected by an automatic sprinkler system complying with Section 903.3.1.1 or an *approved* alternative fire suppression system. The system design shall be based on recommendations in the *approved* technical opinion and report required by Section 322.4.2.1.

**322.4.2.4 Fire alarm systems.** Indoor storage areas for lithium-ion and lithium metal batteries shall be provided with an *approved* automatic fire detection and alarm system complying with Section 907. The fire detection system shall use air-aspirating smoke detection, radiant energy-sensing fire detection, or both.

**322.4.2.5 Explosion control.** Where the *approved* technical opinion and report required by Section 322.4.2.1 recommends explosion control, explosion control complying with Section 911 shall be provided.

**322.4.2.6 Reduced requirements for storage of partially charged batteries.** Indoor storage areas for lithium-ion and lithium metal batteries with a demonstrated state of charge not exceeding 30 percent shall not be required to comply with Section 322.4.2.1, 322.4.2.2, or 322.4.2.5, provided that procedures for limiting and verifying that the state of charge will not exceed 30 percent have been *approved*.

**322.4.3 Outdoor storage.** Outdoor storage of lithium-ion or lithium metal batteries shall comply with Sections 322.4.3.1 through 322.4.3.3.

**322.4.3.1 Distance from storage to exposures.** Outdoor storage of lithium-ion or lithium metal batteries, including storage beneath weather protection in accordance with Section 414.6.1 of the International Building Code, shall comply with one of the following:

1. Battery storage shall be located not less than 20 feet (6096 mm) from any building, lot line, public street, public alley, public way, or means of egress.
2. Battery storage shall be located not less than 3 feet (914 mm) from any building, lot line, public street, public alley, public way, or means of egress, where the battery storage is separated by a 2-hour fire-resistance rated assembly without openings or penetrations and extending 5 feet (1524 mm) above and to the sides of the battery storage area.
3. Battery storage shall be located not less than 3 feet (914 mm) from any building, lot line, public street, public alley, public way, or means of egress, where batteries are contained in *approved* prefabricated portable structures providing a complete 2-hour fire-resistance rated enclosure.

**322.4.3.2 Storage area size limits and separation.** Outdoor storage areas for lithium-ion or lithium metal batteries, including storage beneath weather-protection in accordance with Section 414.6.1 of the International Building Code, shall not exceed 900 square feet (84 m<sup>2</sup>). The height of battery storage in such areas shall not exceed 10 feet (3048 mm). Multiple battery storage areas shall be separated from each other by not less than 10 feet (3048 mm) of open space.

**322.4.3.3 Fire detection.** Outdoor storage areas for lithium-ion or lithium metal batteries, regardless of whether such areas are open, under weather protection or in a prefabricated portable structure, shall be provided with an *approved* automatic fire detection and alarm system complying with Section 907. The fire detection system shall use radiant energy-sensing fire detection.

## **[W] SECTION 323**

### **POWERED MICROMOBILITY DEVICES AND POWERED INDUSTRIAL TRUCKS**

**323.1 General.** Lithium-ion and lithium metal battery powered micromobility devices and powered industrial trucks shall be operated and maintained in accordance with this section.

#### **Exceptions:**

1. Storage, repair and charging in residential occupancies of powered mobility devices, provided that such devices are for personal use by its *owner*.
2. Charging of a single powered mobility device in any occupancy by its *owner*.

**323.1.1 Prohibited locations.** The use of a residential occupancy as a business for the charging of commercially owned powered mobility devices or powered industrial trucks as part of a rental or sales service shall not be permitted.

**323.2 Battery chargers and equipment.** Powered micromobility devices and powered industrial trucks shall be charged in accordance with their listing and the manufacturer's instructions using only the original equipment manufacturer-supplied charging equipment or charging equipment in accordance with the listing and manufacturer's instructions.

**323.3 Listing.** Powered micromobility devices shall be listed and labeled in accordance with UL 2272 or UL 2849, as applicable.

**323.4 Battery charging areas.** Where *approved*, powered micromobility devices and powered industrial trucks shall be permitted to be charged in a room or area that complies with all of the following:

1. Only listed devices utilizing listed charging equipment shall be permitted to be charged.
2. Is provided with sufficient electrical receptacles to allow the charging equipment for each device to be directly connected to a receptacle. Extension cords and relocatable power taps shall not be used.
3. Storage of combustible materials, combustible waste or hazardous materials shall not be permitted.
4. The charging operation shall not be conducted in or obstruct any required means of egress.
5. Removable storage batteries shall not be stacked or charged in an enclosed cabinet unless the cabinet is specially designed and *approved* for such purpose.
6. A minimum distance of 18 inches (457.2 mm) shall be maintained between each removable storage battery during charging operations unless each battery is isolated from neighboring batteries by an *approved* fire-resistant material.
7. A minimum of 18 inches (457.2 mm) shall be maintained between the locations of the batteries on each powered micromobility devices or powered industrial truck during charging operations.

8. The indoor room or area shall be protected by a fire alarm system utilizing air-aspirating smoke detectors or radiant energy-sensing fire detection.

**323.5 Fire safety plan.** A fire safety plan shall be provided in accordance with Section 403.10.6. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

**[S] 323.6 Selling, leasing, renting, and distributing powered micromobility devices and batteries.** The distribution, sale, lease, or rental of *powered micromobility devices* and batteries for such devices shall comply with Sections 323.6.1 through 323.6.2.

**[S] 323.6.1 Listed and labeled.** *Powered micromobility devices* and batteries for *powered micromobility devices* offered for distribution, sale, lease, or rental shall be listed and labeled in accordance with UL 2271, UL 2272, or UL 2849 as applicable.

**[S] 323.6.1.1 Records.** Any *person* who distributes, sells, leases, rents, or offers to sell, lease or rent a *powered micromobility device*, or battery for a *powered micromobility device*, shall maintain documentation of compliance with this section.

**[S] 323.6.2 Signage.** Any *person* who distributes, sells, leases, rents, or offers to sell, lease or rent a *powered micromobility device*, or battery for a *powered micromobility device*, shall post in a conspicuous location on the premises and online via hyperlink all informational safety materials provided by the *fire code official* regarding *powered micromobility devices* and lithium-ion battery safety.

## CHAPTER 4

# EMERGENCY PLANNING AND PREPAREDNESS

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### User note:

**About this chapter:** Chapter 4 addresses the human contribution to life safety in buildings when a fire or other emergency occurs. The requirements for continuous training and scheduled fire, evacuation and lockdown drills can be as important as the required periodic inspections and maintenance of built-in fire protection features. The level of preparation by the occupants also improves the emergency responders' abilities during an emergency. The International Building Code® focuses on built-in fire protection features, such as automatic sprinkler systems, fire-resistance-rated construction and properly designed egress systems, whereas this chapter fully addresses the human element.

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### SECTION 401 GENERAL

**401.1 Scope.** Reporting of emergencies, coordination with emergency response forces, emergency plans and procedures for managing or responding to emergencies shall comply with the provisions of this section.

**Exception:** Firms that have *approved* on-premises fire-fighting organizations and that are in compliance with *approved* procedures for fire reporting.

**[W][S] 401.2 Approval.** Where required by ~~((this code))~~ the fire code official, fire safety plans, emergency procedures and employee training programs shall be ~~((approved by the fire code official))~~ prepared and maintained.

**401.3 Emergency responder notification.** Notification of emergency responders shall be in accordance with Sections 401.3.1 through 401.3.3.

**401.3.1 Fire events.** In the event an unwanted fire occurs on a property, the *owner* or occupant shall immediately report such condition to the fire department.

**401.3.2 Alarm activations.** Upon activation of a fire alarm signal, employees or staff shall immediately notify the fire department.

**401.3.3 Delayed notification.** A person shall not, by verbal or written directive, require any delay in the reporting of a fire to the fire department.

**401.4 Required plan implementation.** In the event an unwanted fire is detected in a building or a fire alarm activates, the emergency plan shall be implemented.

**401.5 Making false report.** A person shall not give, signal or transmit a false alarm.

**401.6 Emergency evacuation drills.** The sounding of a fire alarm signal and the carrying out of an emergency evacuation drill in accordance with the provisions of Section 405 shall be allowed.

**401.7 Unplanned evacuation.** Evacuations made necessary by the unplanned activation of a fire alarm system or by any other emergency shall not be substituted for a required evacuation drill.

**401.8 Interference with fire department operations.** It shall be unlawful to interfere with, attempt to interfere with, conspire to interfere with, obstruct or restrict the mobility of or block the path of travel of a fire department emergency vehicle in any way, or to interfere with, attempt to interfere with, conspire to interfere with, obstruct or hamper any fire department operation.

**[S] 401.9 Evacuation required.** In the event of activation of a fire or emergency alarm, occupants of the building or portion of the building in which the alarm is activated shall make a safe and orderly evacuation out of the building, or as provided in the building's fire safety and evacuation plan.

#### **Exceptions:**

1. Where the occupant's physical or other disability makes the occupant unable to evacuate without assistance and no assistance is immediately available; or
2. Where the presence of smoke, fire, structural collapse or other hazard or obstruction in the occupant's means of egress makes evacuation unsafe.

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**SECTION 402  
DEFINITIONS**

[W] **402.1 Definitions.** The following terms are defined in Chapter 2:

ALARM SIGNAL.

ALERT SIGNAL.

ALERT SYSTEM.

EMERGENCY EVACUATION DRILL.

LOCKDOWN.

RECALL SIGNAL.

SHELTER-IN-PLACE.

**SECTION 403  
EMERGENCY PREPAREDNESS REQUIREMENTS**

**403.1 General.** In addition to the requirements of Section 401, occupancies, uses and outdoor locations shall comply with the emergency preparedness requirements set forth in Sections 403.2 through 403.11.3.3. Where a fire safety and evacuation plan is required by Sections 403.2 through 403.10.5, evacuation drills shall be in accordance with Section 405 and employee training shall be in accordance with Section 406.

[S] **403.2 Group A occupancies.** ~~((An approved))~~ A fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group A occupancies having an occupant load of 100 or more, other than those occupancies used exclusively for purposes of religious worship with an *occupant load* less than 2,000, and for buildings containing both a Group A occupancy and an atrium. Group A occupancies shall comply with Sections 403.2.1 through 403.2.4.

**403.2.1 Seating plan.** In addition to the requirements of Section 404.2, the fire safety and evacuation plans for assembly occupancies shall include a detailed seating plan, *occupant load* and *occupant load* limit. Deviations from the ~~((approved))~~ plans shall ~~((be allowed provided))~~ provide that the *occupant load* limit for the occupancy is not exceeded and the aisles and *exit* accessways remain unobstructed.

**403.2.2 Announcements.** In theaters, motion picture theaters, auditoriums and similar assembly occupancies in Group A used for noncontinuous programs, an audible announcement shall be made not more than 10 minutes prior to the start of each program to notify the occupants of the location of the exits to be used in the event of a fire or other emergency.

**Exception:** In motion picture theaters, the announcement is allowed to be projected on the screen in a manner *approved* by the *fire code official*.

**403.2.3 Fire watch personnel.** Fire watch personnel shall be provided where required by Section 403.11.1.

**403.2.4 Crowd managers.** Crowd managers shall be provided where required by Section 403.11.3.

[S] **403.3 Group B occupancies.** ~~((An approved))~~ A fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for buildings containing a Group B occupancy where the Group B occupancy has an *occupant load* of 500 or more persons or more than 100 persons above or below the lowest *level of exit discharge* and for buildings having an ambulatory care facility.

**403.3.1 Ambulatory care facilities.** Ambulatory care facilities shall comply with the requirements of Sections 401, 403.3.1.1 through 403.3.1.2 and 404 through 406.

[W] **403.3.1.1 Fire safety and evacuation plan.** The fire safety and evacuation plan required by Section 404 shall include a description of special staff actions. This shall include ~~((procedures))~~ a description for stabilizing care recipients in a ~~((defend-in-place response,))~~ staged evacuation ((;)) or full evacuation in conjunction with the entire building, if part of a multitenant facility.

**403.3.1.1.1 Fire safety plan.** A copy of the fire safety plan shall be maintained at the facility at all times. The plan shall include all of the following in addition to the requirements of Section 404:

1. Locations of care recipients who are rendered incapable of self-preservation.
2. Maximum number of care recipients rendered incapable of self-preservation.
3. Area and extent of each ambulatory care facility.
4. Location of any special locking arrangements.

**403.3.1.2 Staff training.** Staff shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by the staff at intervals not exceeding three months. Training of new staff shall be provided promptly on entrance to duty.

Staff shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.

[S] **403.4 Group E occupancies.** (~~An approved~~) A fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group E occupancies and for buildings containing both a Group E occupancy and an atrium. Group E occupancies shall comply with Sections 403.4.1 through 403.4.3.

**403.4.1 First emergency evacuation drill.** The first emergency evacuation drill of each school year shall be conducted within 10 days of the beginning of classes.

**403.4.2 Time of day.** Emergency evacuation drills shall be conducted at different hours of the day or evening, during the changing of classes, when the school is at assembly, during the recess or gymnastic periods, or during other times to avoid distinction between drills and actual fires.

**403.4.3 Assembly points.** Outdoor assembly areas shall be designated and shall be located a safe distance from the building being evacuated so as to avoid interference with fire department operations. The assembly areas shall be arranged to keep each class separate to provide accountability of all individuals.

[W] 403.4.4 Assembly points and fire operations. Assembly points shall not be in areas likely to be utilized for fire service operations.

[S] **403.5 Group F occupancies.** (~~An approved~~) A fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for buildings containing a Group F occupancy where any of the following conditions apply:

1. The Group F occupancy has an *occupant load* of 500 or more persons.
2. The Group F occupancy has an *occupant load* of more than 100 persons above or below the lowest *level of exit discharge*.
3. Group F pallet manufacturing and recycling facilities as required by Section 2810.

[S] **403.6 Group H occupancies.** (~~An approved~~) A fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group H occupancies.

**403.6.1 Group H-5 occupancies.** Group H-5 occupancies shall comply with Sections 403.6.1.1 through 403.6.1.4.

**403.6.1.1 Plans and diagrams.** In addition to the requirements of Section 404 and Section 407.6, plans and diagrams shall be maintained in *approved* locations indicating the approximate plan for each area; the amount and type of HPM stored, handled and used; locations of shutoff valves for HPM supply piping; emergency telephone locations and locations of *exits*.

**403.6.1.2 Plan updating.** The plans and diagrams required by Sections 404, 403.6.1.1 and 407.6 shall be maintained up-to-date and the *fire code official* and fire department shall be informed of major changes.

**403.6.1.3 Emergency response team.** Responsible persons shall be designated as an on-site emergency response team and trained to be liaison personnel for the fire department. These persons shall aid the fire department in preplanning emergency responses, identifying locations where HPM is stored, handled and used, and be familiar with the chemical nature of such material. An adequate number of personnel for each work shift shall be designated.

**403.6.1.4 Emergency drills.** Emergency drills of the on-site emergency response team shall be conducted on a regular basis but not less than once every three months. Records of drills conducted shall be maintained.

[S] **403.7 Group I occupancies.** (~~An approved~~) A fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group I occupancies. Group I occupancies shall comply with Sections 403.7.1 through 403.7.3.6.

**403.7.1 Group I-1 occupancies.** Group I-1 occupancies shall comply with Sections 403.7.1.1 through 403.7.1.7.

**403.7.1.1 Fire safety and evacuation plan.** The fire safety and evacuation plan required by Section 404 shall include a description of special staff actions. Plans shall include all of the following in addition to the requirements of Section 404:

1. Procedures for full evacuation of care recipients.
2. In Group I-1, Condition 2, procedures for staged evacuation of care recipients through a refuge area in an adjacent *smoke compartment* and then to an exterior assembly point.
3. Shall be amended or revised upon admission of any resident care recipient with unusual needs.

**403.7.1.1.1 Fire safety plan.** A copy of the fire safety plan shall be maintained at the facility at all times. The plan shall include the following in addition to the requirements of Section 404.2.2:

1. Location and number of care recipient sleeping rooms.
2. Location of special locking arrangements.

**403.7.1.2 Staff training.** Staff shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by staff at intervals not exceeding three months. Training of new staff shall be provided promptly upon entrance to duty.

**Exception:** A staff person shall not be required to be within three floors or 300 feet (91 440 mm) horizontal distance of the access door of each resident housing area in areas in which all locks are unlocked remotely and automatically in accordance with Section 408.4 of the *International Building Code*.

**403.7.3.5 Notification.** Provisions shall be made for residents in Group I-3 Conditions 3, 4 and 5, as defined in Chapter 2, to readily notify staff of an emergency.

**403.7.3.6 Keys.** Keys necessary for unlocking doors installed in a *means of egress* shall be individually identifiable by both touch and sight.

**[S] 403.8 Group M occupancies.** (~~An approved~~) A fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for buildings containing a Group M occupancy where the Group M occupancy has an *occupant load* of 500 or more persons or more than 100 persons above or below the lowest *level of exit discharge* and for buildings containing both a Group M occupancy and an atrium.

**403.9 Group R occupancies.** Group R occupancies shall comply with Sections 403.9.1 through 403.9.3.4.

**[S] 403.9.1 Group R-1 occupancies.** (~~An approved~~) A fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group R-1 occupancies. Group R-1 occupancies shall comply with Sections 403.9.1.1 through 403.9.1.3.

**403.9.1.1 Evacuation diagrams.** A diagram depicting two evacuation routes shall be posted on or immediately adjacent to every required egress door from each hotel or motel *sleeping unit*.

**403.9.1.2 Emergency duties.** Upon discovery of a fire or suspected fire, hotel and motel employees shall perform the following duties:

1. Activate the fire alarm system, where provided.
2. Notify the public fire department.
3. Take other action as previously instructed.

**403.9.1.3 Fire safety and evacuation instructions.** Information shall be provided in the fire safety and evacuation plan required by Section 404 to allow guests to decide whether to evacuate to the outside, evacuate to an *area of refuge*, remain in place, or any combination of the three.

**[W] 403.9.2 Group R-2 occupancies.** Group R-2 occupancies shall comply with Sections 403.9.2.1 through (~~403.9.2.3~~) 403.9.2.4.

**[S] 403.9.2.1 College and university buildings.** (~~An approved~~) A fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group R-2 college and university buildings. Group R-2 college and university buildings shall comply with Sections 403.9.2.1.1 and 403.9.2.1.2.

**403.9.2.1.1 First emergency evacuation drill.** The first emergency evacuation drill of each school year shall be conducted within 10 days of the beginning of classes.

**403.9.2.1.2 Time of day.** Emergency evacuation drills shall be conducted at different hours of the day or evening, during the changing of classes, when school is at assembly, during recess or gymnastic periods or during other times to avoid distinction between drills and actual fires. One required drill shall be held during hours after sunset or before sunrise.

**403.9.2.2 Emergency guide.** Fire emergency guides shall be provided for Group R-2 occupancies. Guide contents, maintenance and distribution shall comply with Sections 403.9.2.2.1 through 403.9.2.2.3.

**403.9.2.2.1 Guide contents.** A fire emergency guide shall describe the location, function and use of fire protection equipment and appliances available for use by residents, including fire alarm systems, smoke alarms and portable fire extinguishers. Guides shall include an emergency evacuation plan for each *dwelling unit*.

**[S] 403.9.2.2.2 Emergency guide maintenance.** Emergency guides shall be reviewed and, where required, *approved* by the *fire code official*.

**403.9.2.2.3 Emergency guide distribution.** A copy of the emergency guide shall be given to each tenant prior to initial occupancy.

**403.9.2.3 Evacuation diagrams for dormitories.** A diagram depicting two evacuation routes shall be posted on or immediately adjacent to every required egress door from each dormitory *sleeping unit* or *dwelling unit*. Evacuation diagrams shall be reviewed and updated as needed to maintain accuracy.

**[W] 403.9.2.4 Group R-2 assisted living and residential care facilities.** Assisted living and residential care facilities licensed by the state of Washington shall comply with Section 403.7.1 as required for Group I-1 Condition 2 occupancies.

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**403.9.3 Group R-4 occupancies.** An *approved* fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group R-4 occupancies. Group R-4 occupancies shall comply with Sections 403.9.3.1 through 403.9.3.4.

**403.9.3.1 Fire safety and evacuation plan.** The fire safety and evacuation plan required by Section 404 shall include a description of special staff actions. Plans shall include procedures necessary for full evacuation of care recipients, and shall be amended or revised upon admission of care recipients with unusual needs.

**403.9.3.1.1 Fire safety plan.** A copy of the fire safety plan shall be maintained at the facility at all times. The plan shall include the following in addition to the requirements of Section 404.2.2:

1. Location and number of care recipient sleeping rooms.
2. Location of special locking arrangements.

**403.9.3.2 Staff training.** Staff shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by staff at intervals not exceeding three months. Training of new staff shall be provided promptly upon entrance to duty.

Staff shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.

**403.9.3.3 Resident training.** Residents capable of assisting in their own evacuation shall be trained in the proper actions to take in the event of a fire. The training shall include actions to take if the primary escape route is blocked. Residents shall be trained to assist each other in case of fire to the extent their physical and mental abilities permit them to do so without additional personal risk.

**403.9.3.4 Drill frequency.** In addition to the evacuation drills required in Section 405.3, staff shall participate in drills an additional two times a year on each shift. Twelve drills with all occupants shall be conducted in the first year of operation.

**[S] 403.10 Special uses.** Special uses shall be in accordance with Sections 403.10.1 through ~~((403.10.5))~~ 403.10.7.

**403.10.1 Covered and open mall buildings.** Covered and open mall buildings shall comply with the requirements of Sections 403.10.1.1 through 403.10.1.6.

**[S] 403.10.1.1 Malls and mall buildings exceeding 50,000 square feet.** ~~((An approved))~~ A fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for covered malls exceeding 50,000 square feet (4645 m<sup>2</sup>) in aggregate floor area and for open mall buildings exceeding 50,000 square feet (4645 m<sup>2</sup>) in aggregate area within the perimeter line.

**403.10.1.2 Lease plan.** In addition to the requirements of Section 404.2.2, a lease plan that includes the following information shall be prepared for each covered and open mall building:

1. Each occupancy, including identification of tenant.
2. Exits from each tenant space.
3. Fire protection features, including the following:
  - 3.1. Fire department connections.
  - 3.2. Fire command center.
  - 3.3. Smoke management system controls.
  - 3.4. Elevators, elevator machine rooms and controls.
  - 3.5. Hose valve outlets.
  - 3.6. Sprinkler and standpipe control valves.
  - 3.7. Areas protected with automatic sprinkler systems and automatic fire-extinguishing systems.
  - 3.8. Automatic fire detector zones.
  - 3.9. Fire barriers.

**[S] 403.10.1.3 Lease plan, ((approval))** The lease plan shall be ~~((submitted to the fire code official for approval, and shall be))~~ maintained on-site for immediate reference by responding fire service personnel.

**[S] 403.10.1.4 Lease plan revisions.** The lease plans shall be revised annually or as often as necessary to keep them current. ~~((Modifications or changes in tenants or occupancies shall not be made without prior approval of the fire code official and building official.))~~

**403.10.1.5 Tenant identification.** Tenant identification shall be provided for secondary *exits* from occupied tenant spaces that lead to an *exit corridor* or directly to the exterior of the building. Tenant identification shall be posted on the



exterior side of the *exit* or *exit access* door and shall identify the business name and address using plainly legible letters and numbers that contrast with their background.

**Exception:** Tenant identification is not required for anchor stores.

**403.10.1.6 Unoccupied tenant spaces.** The fire safety and evacuation plan shall provide for compliance with the requirements for unoccupied tenant spaces in Section 311.

[S] **403.10.2 High-rise buildings.** ~~((An approved))~~ A fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for high-rise buildings.

[S] **403.10.3 Underground buildings.** ~~((An approved))~~ A fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for underground buildings.

[S] **403.10.4 Buildings using occupant evacuation elevators.** In buildings using occupant evacuation elevators in accordance with Section ~~((3008))~~ 403.6.2 of the *International Building Code*, the fire safety and evacuation plan and the training required by Sections 404 and 406, respectively, shall incorporate specific procedures for the occupants using such elevators.

[S] **403.10.5 Buildings with high-piled storage.** ~~((An approved))~~ A fire safety and evacuation plan in accordance with Section 404 shall be prepared for buildings with *high-piled combustible storage* in any of the following situations:

1. The *high-piled storage area* exceeds 500,000 square feet (46 450 m<sup>2</sup>) for Class I-IV commodities.
2. The *high-piled storage area* exceeds 300,000 square feet (27 870 m<sup>2</sup>) for high-hazard commodities.
3. The *high-piled storage* is located in a Group H occupancy.
4. The *high-piled storage* is located in a Group F occupancy with an *occupant load* of 500 or more persons or more than 100 persons above or below the lowest *level of exit discharge*.
5. The *high-piled storage* is located in a Group M occupancy with an *occupant load* of 500 or more persons or more than 100 persons above or below the lowest *level of exit discharge*.
6. Where required by the *fire code official* for other *high-piled storage areas*.

[W] 403.10.6 Buildings with lithium-ion or lithium metal battery storage. An *approved* fire safety plan in accordance with Section 404 shall be prepared and maintained for buildings with lithium-ion or lithium metal battery storage.

[S] 403.10.7 Site safety plans for structures under construction, alteration and demolition. A site safety plan for structures under construction, alteration and demolition shall be developed as required by Section 3303.1. The plan shall contain the following information:

1. Communication and pre-planning with the Fire Department.
2. Procedures for reporting emergencies to the Fire Department.
3. Procedures for emergency notification, evacuation, and/or relocation of all persons in the building under construction and on the site.
4. Procedures for hot work operations, management of hazardous materials, and removal of combustible debris and maintenance of emergency access roads.
5. Security measures to prevent unauthorized people from gaining access to the site.
6. Installation of new fire protection systems, where applicable, as construction progresses.
7. Floor plans identifying the locations of exits, exit stairs, exit routes, and portable fire extinguishers.
8. Site plans identifying the designated exterior assembly areas for each evacuation route.
9. Site plans identifying required fire apparatus access roadways and on-site fire hydrants.
10. The name and contact phone number of the person(s) responsible for compliance with the site safety plan.

**403.11 Special requirements for public safety.** Special requirements for public safety shall be in accordance with Sections 403.11.1 through 403.11.3.3.

[S] **403.11.1 Fire watch and standby fire personnel.** Where, in the opinion of the *fire code official*, it is essential for public safety in a place of assembly or any other place where people congregate, because of the number of persons, or the nature of the performance, exhibition, display, contest or activity, the *owner*, agent or lessee shall provide, at no cost to the City, one or more fire watch or standby fire personnel, as required and *approved*. Fire watch personnel shall comply with Sections 403.11.1.1 and 403.11.1.2.

**403.11.1.1 Duty times.** Fire watch personnel shall remain on duty while places requiring a fire watch are open to the public, or when an activity requiring a fire watch is being conducted.

[S] **403.11.1.2 Duties.** On-duty fire watch personnel shall have the following responsibilities:

1. Keep diligent watch for fires, obstructions to *means of egress* and other hazards.

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2. Take prompt measures for remediation of hazards and extinguishment of fires that occur.
3. Take prompt measures to assist in the evacuation of the public from the structures.

Fire watch personnel and standby fire personnel are subject to the fire code official's orders at all times; shall remain on duty during the times such places are open to the public, or as otherwise required by the fire code official; and shall not be required or permitted, while on duty, to perform any duties other than those specified by the fire code official.

Where a fire protection system is out of service, the procedures detailed in Administrative Rule 9.04.21, Impaired Fire Protection Systems and Emergency Responder Radio Amplification Systems and any future revisions of this rule adopted by the fire code official shall be implemented.

**[S] 403.11.2 Public safety plan for gatherings.** ~~((Where the fire code official determines that an indoor or outdoor gathering of persons has))~~ An approved public safety plan shall be developed for outdoor assembly events when the projected attendance exceeds 6,000 persons and for indoor or outdoor assembly events when the fire code official believes the event may have an adverse impact on public safety through diminished access to buildings, structures, fire hydrants and fire apparatus access roads or ((where such gatherings)) may adversely affect public safety services of any kind. ((, the fire code official shall have the authority to order the development of or prescribe a public safety plan that provides an approved level of public safety and addresses the following items)) The public safety plan shall include an assessment of all of the following conditions and related safety measures:

- ~~1. Emergency vehicle ingress and egress.~~
- ~~2. Fire protection.~~
- ~~3. Emergency egress or escape routes.~~
- ~~4. Emergency medical services.~~
- ~~5. Public assembly areas.~~
- ~~6. The directing of both attendees and vehicles, including the parking of vehicles.~~
- ~~7. Vendor and food concession distribution.~~
- ~~8. The need for the presence of law enforcement.~~
- ~~9. The need for fire and emergency medical services personnel.~~
- ~~10. The need for a weather monitoring person.))~~
1. Nature of the events and the participants and attendees.
2. Access and egress movement, including crowd density problems.
3. Medical emergencies.
4. Fire hazards and/or fire protection equipment provided.
5. Permanent and temporary structural systems.
6. Severe weather conditions.
7. Earthquakes.
8. Civil or other disturbances.
9. Hazardous materials incidents within and near the facility.
10. Acts of terrorism within and near the facility.
11. Relationships among facility management, event participants, emergency response agencies, and others having a role in the assembly events.

**[W][S] 403.11.3 Crowd managers for gatherings exceeding 500 people.** Where facilities or events involve a gathering of more than 500 people, or as required by the fire code official, crowd managers shall be provided in accordance with Sections 403.11.3.1 through 403.11.3.3.

**403.11.3.1 Number of crowd managers.** Not fewer than two trained crowd managers, and not fewer than one trained crowd manager for each 250 persons or portion thereof, shall be provided for the gathering.

### **Exceptions:**

1. Outdoor events with fewer than 1,000 persons in attendance shall not require crowd managers.
2. Assembly occupancies used exclusively for religious worship with an *occupant load* not exceeding 1,000 shall not require crowd managers.
3. The number of crowd managers shall be reduced where, in the opinion of the *fire code official*, the fire protection provided by the facility and the nature of the event warrant a reduction.

**403.11.3.2 Training.** Training for crowd managers shall be approved.

**403.11.3.3 Duties.** The duties of crowd managers shall include, but not be limited to:

1. Conduct an inspection of the area of responsibility and identify and address any egress barriers.
2. Conduct an inspection of the area of responsibility to identify and mitigate any fire hazards.
3. Verify compliance with all permit conditions, including those governing pyrotechnics and other special effects.
4. Direct and assist the event attendees in evacuation during an emergency.
5. Assist emergency response personnel where requested.
6. Other duties required by the *fire code official*.
7. Other duties as specified in the fire safety plan.

**[S] SECTION 404  
FIRE SAFETY ((~~7~~)) AND EVACUATION ((~~AND LOCKDOWN~~)) PLANS**

**[W][S] 404.1 General.** Where required by Section 403, fire safety ((~~7~~)) and evacuation ((~~and lockdown~~)) plans shall comply with Sections 404.2 through 404.4.1.

**[S] 404.2 Contents.** Fire safety ((~~7~~)) and evacuation ((~~and lockdown~~)) plan contents shall be in accordance with Sections 404.2.1 through 404.2.3.2.

**404.2.1 Fire evacuation plans.** Fire evacuation plans shall include the following:

1. Emergency egress or escape routes and whether evacuation of the building is to be complete by selected floors or areas only or with a defend-in-place response.
2. Procedures for employees who must remain to operate critical equipment before evacuating.
3. Procedures for the use of elevators to evacuate the building where occupant evacuation elevators complying with Section ((~~3008~~)) 403.6.2 of the *International Building Code* are provided.
4. Procedures for assisted rescue for persons unable to use the general *means of egress* unassisted.
5. Procedures for accounting for employees and occupants after evacuation has been completed.
6. Identification and assignment of personnel responsible for rescue or emergency medical aid.
7. The preferred and any alternative means of notifying occupants of a fire or emergency.
8. The preferred and any alternative means of reporting fires and other emergencies to the fire department or designated emergency response organization.
9. Identification and assignment of personnel who can be contacted for further information or explanation of duties under the plan.
10. A description of the emergency voice/alarm communication system alert tone and preprogrammed voice messages, where provided.

**[S] 404.2.2 Fire safety plans.** Fire safety plans shall include the following:

1. The procedure for reporting a fire or other emergency.
2. The life safety strategy including the following:
  - 2.1. Procedures for notifying occupants, including areas with a private mode alarm system.
  - 2.2. Procedures for occupants under a defend-in-place response.
  - 2.3. Procedures for evacuating occupants, including those who need evacuation assistance.
3. Site plans indicating the following:
  - 3.1. The occupancy assembly point.
  - 3.2. The locations of fire hydrants.
  - 3.3. The normal routes of fire department ((~~vehicle~~)) apparatus access.
4. Floor plans identifying the locations of the following:
  - 4.1. *Exits*.
  - 4.2. Primary evacuation routes.
  - 4.3. Secondary evacuation routes.
  - 4.4. Accessible egress routes.
    - 4.4.1. Areas of refuge.
    - 4.4.2. Exterior areas for assisted rescue.

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- 4.5. Refuge areas associated with *smoke barriers* and *horizontal exits*.
- 4.6. Manual fire alarm boxes.
- 4.7. Portable fire extinguishers.
- 4.8. Occupant-use hose stations.
- 4.9. Fire alarm annunciators and controls.
5. A list of major fire hazards associated with the normal use and occupancy of the premises, including maintenance and housekeeping procedures.
6. Identification and assignment of personnel responsible for maintenance of systems and equipment installed to prevent or control fires.
7. Identification and assignment of personnel responsible for maintenance, housekeeping and controlling fuel hazard sources.

[W] ~~((404.2.3 Lockdown plans. Lockdown plans shall only be permitted where such plans are approved by the fire code official and are in compliance with Sections 404.2.3.1 and 404.2.3.2.~~

~~404.2.3.1 Lockdown plan contents. Lockdown plans shall include the following:~~

- ~~1. Identification of individuals authorized to issue a lockdown order.~~
- ~~2. Security measures used during normal operations, when the building is occupied, that could adversely affect egress or fire department operations.~~
- ~~3. A description of identified emergency and security threats addressed by the plan, including specific lockdown procedures to be implemented for each threat condition.~~
- ~~4. Means and methods of initiating a lockdown plan for each threat, including:~~
  - ~~4.1. The means of notifying occupants of a lockdown event, which shall be distinct from the fire alarm signal.~~
  - ~~4.2. Identification of each door or other access point that will be secured.~~
  - ~~4.3. A description of the means or methods used to secure doors and other access points.~~
  - ~~4.4. A description of how locking means and methods are in compliance with the requirements of this code for egress and accessibility.~~
- ~~5. Procedures for reporting to the fire department any lockdown condition affecting egress or fire department operations.~~
- ~~6. Procedures for determining and reporting the presence or absence of occupants to emergency response agencies during a lockdown.~~
- ~~7. Means for providing two-way communication between a central location and each area subject to being secured during a lockdown.~~
- ~~8. Identification of the prearranged signal for terminating the lockdown.~~
- ~~9. Identification of individuals authorized to issue a lockdown termination order.~~
- ~~10. Procedures for unlocking doors and verifying that the means of egress has been returned to normal operations upon termination of the lockdown.~~
- ~~11. Training procedures and frequency of lockdown plan drills.~~

~~404.2.3.2 Drills. Lockdown plan drills shall be conducted in accordance with the approved plan. Such drills shall not be substituted for fire and evacuation drills required by Section 405.3.)~~

■ **404.3 Maintenance.** Fire safety, evacuation and lockdown plans shall be reviewed or updated annually or as necessitated by changes in staff assignments, occupancy or the physical arrangement of the building.

■ **404.4 Availability.** Fire safety, evacuation and lockdown plans shall be available in the workplace for reference and review by employees, and copies shall be furnished to the *fire code official* for review on request.

■ **404.4.1 Distribution.** The fire safety, evacuation and lockdown plans shall be distributed to the tenants and building service employees by the *owner* or *owner's* agent. Tenants shall distribute to their employees applicable parts of the fire safety plan and lockdown plan affecting the employees' actions in the event of a fire or other emergency.

## [S] SECTION 405 EMERGENCY ((EVACUATION)) DRILLS

■ [S] **405.1 General.** Emergency ((fire and evacuation)) drills complying with Sections 405.3 through 405.10 shall be conducted not less than annually where fire safety and evacuation plans are required by Section 403 or where required by the *fire code*

*official*. Lockdown plan drills shall be conducted in accordance with the *approved* plan. Such drills shall not be substituted for fire and evacuation drills required by Section 405.3. Drills shall be designed in cooperation with the local authorities.

**405.2 Occupant participation.** Emergency fire and evacuation drills shall involve the actual evacuation of occupants to a selected assembly point and shall provide occupants with experience in exiting through required exits.

**Exceptions:**

1. In ambulatory care facilities and Group I-2, the movement of care recipients to a safe area or to the exterior of the building is not required.
2. In Group I-1, Condition 2, the assembly point for residents is permitted to be within an adjacent *smoke compartment*.
3. In Group R-4, actual exiting from emergency escape and rescue openings shall not be required. Opening the emergency escape and rescue openings and signaling for help shall be an acceptable alternative.
4. In Group I-3, Conditions 2 through 5 where a defend-in-place response is permitted, the assembly point for detainees is permitted to be within an adjacent *smoke compartment*.
5. In Group I-3, Conditions 2 through 5, movement of detainees is not required to an assembly point where there are security concerns.

**[W][S] 405.3 Frequency.** Required emergency (~~evacuation~~) drills shall be held at the intervals specified in Table 405.3 or more frequently where necessary to familiarize all occupants with the drill procedure.

**[S] TABLE 405.3  
(~~FIRE AND EVACUATION~~) EMERGENCY DRILL FREQUENCY AND PARTICIPATION**

GROUP OR OCCUPANCY	FREQUENCY	PARTICIPATION
Group A	Quarterly	Staff
Group B <sup>a</sup>	Annually	All occupants
Group B (Ambulatory care facilities)	Quarterly on each shift	Staff
Group B <sup>a</sup> (Clinic, outpatient)	Annually	Staff
Group E	Monthly	All occupants
Group F	Annually	Employees
Group I-1 <sup>c</sup>	Semiannually on each shift	All occupants
Group I-2	Quarterly on each shift	Staff
Group I-3	Quarterly on each shift	Staff
Group I-4	Monthly on each shift	All occupants
Group R-1	Quarterly on each shift	Employees
Group R-2 <sup>b</sup>	Four annually	All occupants
Group R-4 <sup>c</sup>	Semiannually on each shift	All occupants
<u>High rise buildings</u>	<u>Annually</u>	<u>Employees</u>

- a. Emergency evacuation drills are required in Group B buildings having an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
- b. Emergency evacuation drills in Group R-2 college and university buildings shall be in accordance with Section 403.9.2.1. Other Group R-2 occupancies shall be in accordance with Section 403.9.2.2.
- c. In groups I-1 and R-4, see Sections 403.7.1.4 and 403.9.3.4 for additional drills for staff.

**405.4 Leadership.** Responsibility for the planning and conduct of drills shall be assigned to competent persons designated to exercise leadership.

**[W][S] 405.5 Time.** Drills shall be held at unexpected times and under varying conditions to simulate the unusual conditions that occur in case of (~~fire~~) an emergency.

**Exceptions:**

1. In severe climates, the *fire code official* shall have the authority to modify the emergency evacuation drill termination points and frequency.
2. In Groups I-1, I-2, I-3 and R-4, where staff-only emergency evacuation drills are conducted after visiting hours or where care recipients are expected to be asleep, a coded announcement shall be an acceptable alternative to audible alarms.

**[W][S] 405.6 Recordkeeping.** Records shall be maintained of required emergency evacuation drills and include the following information:

## EMERGENCY PLANNING AND PREPAREDNESS

1. Identity of the person conducting the drill.
2. Date and time of the drill.
3. Notification method used.
4. Employees on duty and participating.
5. Number of occupants (~~(evacuated)~~) participating.
6. Special conditions simulated.
7. Problems encountered and corrective actions taken.
8. Weather conditions when occupants were evacuated.
9. Time required to accomplish complete evacuation.

**405.7 Notification.** Where required by the *fire code official*, prior notification of emergency evacuation drills shall be given to the *fire code official*.

**405.8 Initiation.** Where a fire alarm system is provided, emergency evacuation drills shall be initiated by activating the fire alarm system.

**[W][S] 405.9 Accountability.** As building occupants arrive at the assembly point, efforts shall be made to determine if all occupants have been successfully evacuated and/or have been accounted for.

**Exception:** In Group I-2 and ambulatory care facilities, the movement of care recipients to safe areas or to the exterior of the building is not required.

**[W][S] 405.10 Recall and reentry.** (~~(An electrically or mechanically operated signal used to recall occupants after an evacuation shall be separate and distinct from the signal used to initiate the evacuation.)~~) The recall signal initiation (~~(means)~~) shall be manually operated and under the control of the person in charge of the premises or the official in charge of the incident. Persons shall not reenter the premises until authorized to do so by the official in charge.

## SECTION 406 EMPLOYEE TRAINING AND RESPONSE PROCEDURES

**[W][S] 406.1 General.** (~~(Where fire safety and evacuation plans are required by Section 403, employees shall be trained in fire emergency procedures based on plans prepared in accordance with Section 404.)~~) Employees in the occupancies listed in Section 403 shall be trained in the emergency procedures described in their emergency plans. Training shall be based on these plans and as described in Sections 406.2 and 406.3.5.

**[W] 406.2 Frequency.** Employees shall receive training in the contents of (~~(fire safety and evacuation)~~) the emergency plans and their duties as part of new employee orientation and (~~(not less than)~~) at least annually thereafter. Records (~~(of training)~~) shall be (~~(maintained)~~) kept and made available to the fire code official upon request.

**[W][S] 406.3 Employee training program.** Employees shall be trained in fire prevention, evacuation, sheltering-in-place, and fire safety in accordance with Sections 406.3.1 through (~~(406.3.4)~~) 406.3.5.

**406.3.1 Fire prevention training.** Employees shall be apprised of the fire hazards of the materials and processes to which they are exposed. Each employee shall be instructed in the proper procedures for preventing fires in the conduct of their assigned duties.

**406.3.2 Evacuation training.** Employees shall be familiarized with the fire alarm and evacuation signals, their assigned duties in the event of an alarm or emergency, evacuation routes, areas of refuge, exterior assembly areas and procedures for evacuation.

**406.3.3 Fire safety training.** Employees assigned fire-fighting duties shall be trained to know the locations and proper use of portable fire extinguishers or other manual fire-fighting equipment and the protective clothing or equipment required for its safe and proper use.

**[W] (~~406.3.4 Emergency lockdown training.~~** Where a facility has a lockdown plan, employees shall be trained on their assigned duties and procedures in the event of an emergency lockdown.)

**[W] 406.3.5 Emergency shelter-in-place training.** Where a facility has a shelter-in-place plan, employees shall be trained on the alert and recall signals, communication systems, location of emergency supplies, the use of incident notification and alarm system, and their assigned duties and procedures in the event of an alarm or emergency.

## Part III—Building and Equipment Design Features

### CHAPTER 5 FIRE SERVICE FEATURES

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**User note:**

**About this chapter:** Chapter 5 provides requirements that apply to all buildings and occupancies and pertain to access roads, access to building openings and roofs, premises identification, key boxes, fire protection water supplies, fire command centers, fire department access to equipment and emergency responder radio coverage in buildings. Although many safety features are part of the building design, features such as proper fire department access roads and radio coverage are necessary in case of emergency and are important tools for emergency responders for public safety and their own safety.

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#### SECTION 501 GENERAL

**501.1 Scope.** Fire service features for buildings, structures and premises shall comply with this chapter.

**501.2 Permits.** A permit shall be required as set forth in Sections 105.5 and 105.6.

**501.3 Construction documents.** *Construction documents* for proposed fire apparatus access, location of *fire lanes*, security gates across fire apparatus access roads and *construction documents* and hydraulic calculations for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction.

[S] **501.3.1 Site safety plan.** The *owner* or *owner's* authorized agent shall be responsible for the development, implementation and maintenance of ~~((an approved))~~ a written *site safety plan* in accordance with Section 3303.

**501.4 Timing of installation.** Where fire apparatus access roads or a water supply for fire protection are required to be installed, such protection shall be installed and made serviceable prior to and during the time of construction except where *approved* alternative methods of protection are provided. Temporary street signs shall be installed at each street intersection where construction of new roadways allows passage by vehicles in accordance with Section 505.2.

#### SECTION 502 DEFINITIONS

[W] **502.1 Definitions.** The following terms are defined in Chapter 2:

**AGENCY.**

**FIRE APPARATUS ACCESS ROAD.**

**FIRE COMMAND CENTER.**

**FIRE DEPARTMENT MASTER KEY.**

**FIRE LANE.**

**FREQUENCY.**

**FREQUENCY LICENSE AUTHORITY.**

**FREQUENCY LICENSE HOLDER.**

**KEY BOX.**

**TRAFFIC CALMING DEVICES.**

#### SECTION 503 FIRE APPARATUS ACCESS ROADS

[S] **503.1 Where required.** Fire apparatus access roads shall be provided and maintained in accordance with Sections 503.1.1 through 503.1.3 and Appendix D as amended.

[S] **503.1.1 Buildings and facilities.** *Approved* fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire apparatus access road shall

## FIRE SERVICE FEATURES

comply with the requirements of this section and shall extend to within 150 feet (45 720 mm) of all portions of the facility and all portions of the *exterior walls* of the first story of the building as measured by an *approved* route around the exterior of the building or facility.

### Exceptions:

1. The *fire code official* is authorized to increase the dimension ~~((of 150 feet (45 720 mm)))~~ where any of the following conditions occur:
  - 1.1. The distance may be increased to 375 feet (114 300 mm) when the building is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 ((~~7~~) or 903.3.1.2, ((~~or 903.3.1.3.~~)) The distance may be increased up to 500 feet (152 400 mm) for one- or two-family dwellings and townhouses when the building is equipped with an *approved automatic sprinkler system*.
  - 1.2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, nonnegotiable grades or other similar conditions, and an *approved* alternative means of fire protection is provided.
  - 1.3. ~~((There are not more than two Group R-3 or Group U occupancies.))~~ The distance may be increased to 200 feet (60 960 mm) for not more than two one- and two-family dwellings served by an access road. The access road can serve more than two dwellings, but only two are permitted to use the 200-foot (60 960 mm) distance.
  - 1.4. Where a monitored smoke detection is provided throughout school portables exceeding the 150-foot (45 720 mm) distance.
2. Where *approved* by the *fire code official*, fire apparatus access roads shall be permitted to be exempted or modified for solar photovoltaic power generation facilities.

**503.1.2 Additional access.** The *fire code official* is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

**503.1.3 High-piled storage.** Fire department vehicle access to buildings used for *high-piled combustible storage* shall comply with the applicable provisions of Chapter 32.

**[S] 503.2 Specifications.** Fire apparatus access roads shall be installed and arranged in accordance with Sections 503.2.1 through 503.2.8. Fire apparatus access roads shall not traverse underneath buildings unless *approved*.

**[S] 503.2.1 Dimensions.** Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (6096 mm), exclusive of shoulders, except for *approved* security gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than ~~((13 feet 6 inches (4115 mm)))~~ 14 feet (4267 mm).

### Exceptions:

1. Access roads serving not more than two one-family dwellings or a single two-family dwelling shall have an unobstructed width of not less than 12 feet (3658 mm).
2. Public streets shall be in accordance with *Streets Illustrated*, the *Seattle Right-of-Way Improvements Manual*.

**503.2.2 Authority.** The *fire code official* shall have the authority to require or permit modifications to the required access widths where they are inadequate for fire or rescue operations or where necessary to meet the public safety objectives of the jurisdiction.

**503.2.3 Surface.** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all-weather driving capabilities.

**[S] 503.2.4 Turning radius.** The required turning radius of a fire apparatus access road shall be ~~((determined by the *fire code official*))~~ 25 feet (7620 mm) minimum inside curb and 50 feet (15 240 mm) minimum outside curb.

**[S] 503.2.5 Dead ends.** Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) in length shall be provided with ~~((an *approved* area for turning around fire apparatus))~~ a turnaround in accordance with Appendix D as amended.

**[S] 503.2.6 Bridges and elevated surfaces.** Where a bridge or an elevated surface is part of a fire apparatus access road, the bridge shall be constructed and maintained in accordance with ~~((AASHTO HB-17))~~ *Streets Illustrated*, the *Seattle Right-of-Way Improvements Manual*. Bridges and elevated surfaces shall be designed for a live load sufficient to carry the imposed loads of fire apparatus. Vehicle load limits shall be posted at both entrances to bridges where required by the *fire code official*. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces that are not designed for such use, *approved* barriers, *approved* signs or both shall be installed and maintained where required by the *fire code official*.

**[S] 503.2.7 Grade.** The grade of the fire apparatus access road shall be ~~((within the limits established by the *fire code official* based on the fire department's apparatus))~~ in accordance with Appendix D as amended.



[S] **503.2.8 Angles of approach and departure.** The angles of approach and departure for fire apparatus access roads shall be ~~((within the limits established by the fire code official based on the fire department's apparatus))~~ in accordance with Streets Illustrated, the Seattle Right-of-Way Improvements Manual. Private fire apparatus access roads shall have an angle of approach and departure that shall not exceed 8 percent, unless approved by the fire code official.

**503.3 Marking.** Where required by the *fire code official*, approved signs or other approved notices or markings that include the words “NO PARKING—FIRE LANE” shall be provided for fire apparatus access roads to identify such roads or prohibit the obstruction thereof. The means by which *fire lanes* are designated shall be maintained in a clean and legible condition at all times and be replaced or repaired when necessary to provide adequate visibility.

**503.4 Obstruction of fire apparatus access roads.** Fire apparatus access roads shall not be obstructed in any manner, including the parking of vehicles. The minimum widths and clearances established in Sections 503.2.1 and 503.2.2 shall be maintained at all times.

**503.4.1 Traffic calming devices.** Traffic calming devices shall be prohibited unless approved by the *fire code official*.

**503.5 Required gates or barricades.** The *fire code official* is authorized to require the installation and maintenance of gates or other approved barricades across fire apparatus access roads, trails or other accessways, not including public streets, alleys or highways. Electric gate operators, where provided, shall be listed in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F2200.

**503.5.1 Secured gates and barricades.** Where required, gates and barricades shall be secured in an approved manner. Roads, trails and other accessways that have been closed and obstructed in the manner prescribed by Section 503.5 shall not be trespassed on or used unless authorized by the owner and the *fire code official*.

**Exception:** The restriction on use shall not apply to public officers acting within the scope of duty.

[S] **503.6 ((Security)) Non-required security gates and barricades.** The installation of non-required security gates or barricades across a fire apparatus access road shall be approved by the *fire code official*. Where security gates are installed, they shall have an approved means of emergency operation. The security gates and the emergency operation shall be maintained operational at all times. Electric gate operators, where provided, shall be listed in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F2200.

## SECTION 504 ACCESS TO BUILDING OPENINGS AND ROOFS

**504.1 Required access.** Exterior doors and openings required by this code or the *International Building Code* shall be maintained readily accessible for emergency access by the fire department. An approved access walkway leading from fire apparatus access roads to exterior openings shall be provided where required by the *fire code official*.

**504.2 Maintenance of exterior doors and openings.** Exterior doors and their function shall not be eliminated without prior approval. Exterior doors that have been rendered nonfunctional and that retain a functional door exterior appearance shall have a sign affixed to the exterior side of the door with the words “THIS DOOR BLOCKED.” The sign shall consist of letters having a principal stroke of not less than 3/4 inch (19.1 mm) wide and not less than 6 inches (152 mm) high on a contrasting background. Required fire department access doors shall not be obstructed or eliminated. *Exit* and exit access doors shall comply with Chapter 10. Access doors for *high-piled combustible storage* shall comply with Section 3206.7.

**504.3 Stairway access to roof.** New buildings four or more stories above grade plane, except those with a roof slope greater than four units vertical in 12 units horizontal (33.3-percent slope), shall be provided with a *stairway* to the roof. *Stairway* access to the roof shall be in accordance with Section 1011.12. Such *stairway* shall be marked at street and floor levels with a sign indicating that the *stairway* continues to the roof. Where roofs are used for landscaped roofs or for other purposes, stairways shall be provided as required for such occupancy classification.

## SECTION 505 PREMISES IDENTIFICATION

**505.1 Address identification.** New and existing buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be not less than 4 inches (102 mm) high with a minimum stroke width of 1/2 inch (12.7 mm). Where required by the *fire code official*, address identification shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road and the building cannot be viewed from the *public way*, a monument, pole or other sign or means shall be used to identify the structure. Address identification shall be maintained.

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**505.2 Street or road signs.** Streets and roads shall be identified with *approved* signs. Temporary signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles. Signs shall be of an *approved* size, weather resistant and be maintained until replaced by permanent signs.

**[S] 505.3 Docks, piers, wharves and floats.** *Approved* signage shall be provided and maintained on the shore end of all docks, piers, wharves and floats that identifies the maximum overall length in feet of the dock, pier, wharf or float from the shore.

**505.3.1 Signage.** The signage shall be weather resistant, legible and placed in a position at the entrance to the dock, pier, wharf or float. Characters shall be Arabic numbers or alphabetical letters and shall be white on a contrasting red background.

**505.3.2 Measurements.** The measurement shall include any stairs or ramps that connect the dock, pier, wharf or float to the entrance. Distances shall be rounded up to the nearest 50-foot (15 240 mm) increment. The longest distance shall be used when more than one dock or finger is present.

## SECTION 506 KEY BOXES

### 506.1 Point of Information

The fire code official has approved the “KnoxBox” as the access key box for use in Seattle. For more information see Seattle Fire Department Information Bulletin 5965, Key Boxes for Emergency Access.

**[S] 506.1 Where required.** Key boxes shall be installed in accordance with this section.

**[S] 506.1.1 Access key box.** Where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for life-saving or fire-fighting purposes, the *fire code official* is authorized to require a key box to be installed in an *approved* location. The key box shall be of an *approved* type listed in accordance with UL 1037, and shall contain keys to gain necessary access as required by the *fire code official*.

**[S] ((506.1.1 Locks.** An *approved* lock shall be installed on gates or similar barriers where required by the *fire code official*.

**506.1.2 Key boxes for nonstandardized fire service elevator keys.** Key boxes provided for nonstandardized fire service elevator keys shall comply with Section 506.1 and all of the following:

1. The key box shall be compatible with an existing rapid entry key box system in use in the jurisdiction and *approved* by the *fire code official*.
2. The front cover shall be permanently labeled with the words “FIRE DEPARTMENT USE ONLY — ELEVATOR KEYS.”
3. The key box shall be mounted at each elevator bank at the lobby nearest to the lowest level of fire department access.
4. The key box shall be mounted 5 feet 6 inches (1676 mm) above the finished floor to the right side of the elevator bank.
5. Contents of the key box are limited to fire service elevator keys. Additional elevator access tools, keys and information pertinent to emergency planning or elevator access shall be permitted where authorized by the *fire code official*.
6. In buildings with two or more elevator banks, a single key box shall be permitted to be used where such elevator banks are separated by not more than 30 feet (9144 mm). Additional key boxes shall be provided for each individual elevator or elevator bank separated by more than 30 feet (9144 mm).

**Exception:** A single key box shall be permitted to be located adjacent to a *fire command center* or the nonstandard fire service elevator key shall be permitted to be secured in a key box used for other purposes and located in accordance with Section 506.1.)

**[S] 506.1.2 Elevator key box.** An elevator key box locked and keyed to the standard City elevator key box access key shall be provided at the designated recall floor above the Phase I recall switch or in the main lobby above the hall call button when no recall feature exists.

**[S] 506.1.2.1 Elevator key box requirements.** The elevator key box shall meet the following standards:

1. Dimensions – 8 inches (203 mm) high, 6 inches (152 mm) wide and 1 inch (25 mm) deep.
2. Material – 16 gauge steel welded.
3. Color – red unless located in the main lobby above the call button, 6 feet (1829 mm) nominal above the floor, in which case any color is *approved*.
4. Labeling – “FOR FIRE DEPARTMENT USE.”
5. Lock openable with factory restricted Medeco 3, level 7 key.

6. Mounting height shall be 6 feet (1829 mm) nominal above the floor.

**[S] 506.1.2.2 Elevator key box contents.** Keys for access to and for the operation of elevator equipment shall be tagged, labeled, and retained in the key box. The elevator key box shall contain standard and non-standard fire emergency service keys (Phase I and II, one key for each switch) in addition to keys for all of the following:

1. Machine room door;
2. Secondary level door;
3. Pit door;
4. Roof door;
5. Independent, hospital emergency and/or attendant operation;
6. Hoistway access;
7. Mechanical hoist access devices (broken arm, lunar, etc.);
8. Miscellaneous switch keys;
9. Fire alarm panel room;
10. Sprinkler valve control room.

#### **506.1.2.2 Point of Information**

Due to security consideration, elevator key boxes should not contain master keys to tenant spaces. Keys in elevator key boxes should be limited to those for access of the building systems and equipment listed in *Seattle Fire Code*, Section 506.1.2.2.

**[S] 506.1.3 Locks.** An approved lock shall be installed on gates or similar barriers when required by the fire code official.

**506.2 Key box maintenance.** The operator of the building shall immediately notify the *fire code official* and provide the new key where a lock is changed or rekeyed. The key to such lock shall be secured in the key box.

## **SECTION 507 FIRE PROTECTION WATER SUPPLIES**

**[S] 507.1 Required water supply.** An approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises on which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction, and for buildings undergoing a substantial alteration as determined by the Seattle Department of Construction and Inspections, when required by the fire code official. Additions to existing buildings, other than one-or two-family dwellings and townhouses, that increase the fire-flow calculation area to a higher required fire flow per Appendix B shall be required to comply with this section.

**507.2 Type of water supply.** A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

**507.2.1 Private fire service mains.** Private fire service mains and appurtenances shall be installed in accordance with NFPA 24.

**507.2.2 Water tanks.** Water tanks for private fire protection shall be installed in accordance with NFPA 22.

**[W][S] 507.3 Fire flow.** Fire-flow requirements for buildings or portions of buildings and facilities shall be ~~((determined by an approved method))~~ in accordance with Appendix B.

#### **Exceptions:**

1. Fire flow is not required for structures under 500 square feet (46 m<sup>2</sup>) with a B, U, or R-1 occupancy where structures are at least 30 feet (9144 mm) from any other structure and are used only for recreation.
2. In rural and suburban areas in which adequate and reliable water supply do not exist, the fire code official is authorized to utilize NFPA 1142 or the *International Wildland-Urban Interface Code*.
3. Fire flow requirements for shipyards and designated marine hot work facilities shall be in accordance with Administrative Rule 26.02.14 and any future revisions to this rule adopted by the fire code official.
4. Fire flow requirements for new and existing covered marinas shall be in accordance with Chapters 36 and 94 respectively.

**507.4 Water supply test.** The *fire code official* shall be notified prior to the water supply test. Water supply tests shall be witnessed by the *fire code official* or approved documentation of the test shall be provided to the *fire code official* prior to final approval of the water supply system.

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**507.5 Fire hydrant systems.** Fire hydrant systems shall comply with Sections 507.5.1 through 507.5.6.

**[S] 507.5.1 Where required.** Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet (122 m) from a hydrant on a fire apparatus access road, as measured by an *approved* route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the *fire code official*.

### Exceptions:

1. For Group R-3 and Group U occupancies and one- or two-family dwellings and townhouses, the distance requirement shall be 600 feet (183 m).
2. For buildings equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the distance requirement shall be 600 feet (183 m).

**507.5.1.1 Hydrant for standpipe systems.** Buildings equipped with a standpipe system installed in accordance with Section 905 shall have a fire hydrant within 100 feet (30 480 mm) of the fire department connections.

**Exception:** The distance shall be permitted to exceed 100 feet (30 480 mm) where *approved* by the *fire code official*.

**507.5.2 Inspection, testing and maintenance.** Fire hydrant systems shall be subject to periodic tests as required by the *fire code official*. Fire hydrant systems shall be maintained in an operative condition at all times and shall be repaired where defective. Additions, repairs, alterations and servicing shall comply with *approved* standards. Records of tests and required maintenance shall be maintained.

**507.5.3 Private fire service mains and water tanks.** Private fire service mains and water tanks shall be periodically inspected, tested and maintained in accordance with NFPA 25 at the following intervals:

1. Private fire hydrants of all types: Inspection annually and after each operation; flow test and maintenance annually.
2. Fire service main piping: Inspection of exposed, annually; flow test every 5 years.
3. Fire service main piping strainers: Inspection and maintenance after each use.

Records of inspections, testing and maintenance shall be maintained.

**507.5.4 Obstruction.** Unobstructed access to fire hydrants shall be maintained at all times. The fire department shall not be deterred or hindered from gaining immediate access to fire protection equipment or fire hydrants.

**507.5.5 Clear space around hydrants.** A 3-foot (914 mm) clear space shall be maintained around the circumference of fire hydrants, except as otherwise required or *approved*.

**[S] 507.5.6 Physical protection.** Where fire hydrants are subject to impact by a motor vehicle, guard posts or other *approved* means shall comply with Section 312. Any horizontal, lateral, or diagonal elements that are a part of the protection for a fire hydrant shall not interfere with the ability to freely access and safely operate the hydrant.

## SECTION 508 FIRE COMMAND CENTER

**508.1 General.** Where required by other sections of this code and in all buildings classified as high-rise buildings by the *International Building Code* and in all F-1 and S-1 occupancies with a building footprint greater than 500,000 square feet (46 452 m<sup>2</sup>), a *fire command center* for fire department operations shall be provided and shall comply with Sections 508.1.1 through 508.1.7.

**508.1.1 Location and access.** The location and access to the *fire command center* shall be *approved* by the *fire code official*.

**[W] 508.1.2 Separation.** The *fire command center* shall be separated from the remainder of the building by not less than a ((+)) 2-hour *fire barrier* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assembly* constructed in accordance with Section 711 of the *International Building Code*, or both.

**508.1.3 Size.** The *fire command center* shall be not less than 0.015 percent of the total building area of the facility served or 200 square feet (19 m<sup>2</sup>) in area, whichever is greater, with a minimum dimension of 0.7 times the square root of the room area or 10 feet (3048 mm), whichever is greater.

Where a *fire command center* is required for Group F-1 and S-1 occupancies with a building footprint greater than 500,000 square feet (46 452 m<sup>2</sup>), the *fire command center* shall have a minimum size of 96 square feet (9 m<sup>2</sup>) with a minimum dimension of 8 feet (2438 mm) where *approved* by the *fire code official*.

**508.1.4 Layout approval.** A layout of the *fire command center* and all features required by this section to be contained therein shall be submitted for approval prior to installation.

**508.1.5 Storage.** Storage unrelated to operation of the *fire command center* shall be prohibited.

**[S] 508.1.6 Required features.** The *fire command center* shall comply with NFPA 72 and shall contain the following features:

1. The emergency voice/alarm communication system control unit.
2. The fire department communications system.
3. Fire detection and alarm system annunciator.
4. Annunciator unit visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air distribution systems.
6. The fire fighter's control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking *interior exit stairway* doors simultaneously.
8. Sprinkler valve and water-flow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, *means of egress*, *fire protection systems*, fire-fighter air-replenishment systems, fire-fighting equipment and fire department access, and the location of *fire walls*, *fire barriers*, *fire partitions*, *smoke barriers* and smoke partitions.
13. An *approved* Building Information Card that includes, but is not limited to, all of the following information:
  - 13.1. General building information that includes: property name, address, the number of floors in the building above and below grade, use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor) and the estimated building population during the day, night and weekend.
  - 13.2. Building emergency contact information that includes: a list of the building's emergency contacts including but not limited to building manager, building engineer and their respective work phone number, cell phone number and email address.
  - 13.3. Building construction information that includes: the type of building construction including but not limited to floors, walls, columns and roof assembly.
  - 13.4. *Exit access stairway* and *exit stairway* information that includes: number of *exit access stairways* and *exit stairways* in building; each *exit access stairway* and *exit stairway* designation and floors served; location where each *exit access stairway* and *exit stairway* discharges, *interior exit stairways* that are pressurized; *exit stairways* provided with emergency lighting; each *exit stairway* that allows reentry; *exit stairways* providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve; location of elevator machine rooms, control rooms and control spaces; location of sky lobby; and location of freight elevator banks.
  - 13.5. Building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator and location of natural gas service.
  - 13.6. *Fire protection system* information that includes: location of standpipes, location of fire pump room, location of fire department connections, floors protected by automatic sprinklers and location of different types of *automatic sprinkler systems* installed including but not limited to dry, wet and pre-action.
  - 13.7. Hazardous material information that includes: location and quantity of hazardous material.
14. Work table.
15. Generator supervision devices, manual start and (~~transfer~~) stop features.
16. Public address system, where specifically required by other sections of this code.
17. Elevator fire recall switch in accordance with ASME A17.1/CSA B44.
18. Elevator emergency or standby power selector switch(es), where emergency or legally required standby power is provided.
19. On-site fire protection water tank fill valve control switch, tank level indicators, tank low level alarm, and tank fill signal.

**508.1.7 Fire command center identification.** The *fire command center* shall be identified by a permanent, easily visible sign stating "FIRE COMMAND CENTER" located on the door to the *fire command center*.

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### SECTION 509 FIRE PROTECTION AND UTILITY EQUIPMENT IDENTIFICATION AND ACCESS

**509.1 Identification.** Fire protection equipment shall be identified in an *approved* manner. Rooms containing controls for air-conditioning systems or *fire protection systems* shall be identified for the use of the fire department. *Approved* signs required to identify *fire protection system* equipment and equipment location shall be constructed of durable materials, permanently installed and readily visible.

**509.1.1 Utility identification.** Where required by the *fire code official*, gas shutoff valves, electric meters, service switches and other utility equipment shall be clearly and legibly marked to identify the unit or space that it serves. Identification shall be made in an *approved* manner, readily visible and shall be maintained.

**509.2 Equipment access.** *Approved* access shall be provided and maintained for all *fire protection system* equipment to permit immediate safe operation and maintenance of such equipment. Storage, trash and other materials or objects shall not be placed or kept in such a manner that would prevent such equipment from being readily accessible.

### SECTION 510 EMERGENCY RESPONDER COMMUNICATION COVERAGE

**[W][S] 510.1 Emergency responder communication coverage in new buildings.** *Approved* in-building, ~~((two-way))~~ emergency responder communications ~~((coverage))~~ enhancement system (ERCES) for emergency responders shall be provided in all new buildings. In-building, ~~((two-way emergency responder communication coverage))~~ ERCES shall be provided within ~~((the))~~ buildings ~~((shall be based on the existing coverage levels of the public safety communication systems utilized by the jurisdiction, measured at the exterior of the building.))~~ meeting any of the following conditions:

1. High rise buildings;
2. The total building area is 50,000 square feet (4645 m<sup>2</sup>) or more;
3. The total basement area is 10,000 square feet (929 m<sup>2</sup>) or more; or
4. There are floors used for human occupancy more than 30 feet (9144 mm) below the finished floor of the lowest level of exit discharge.

The ERCES shall be installed in accordance with Sections 510.4 through 510.5.8 of this code and the provisions of NFPA 1225 (2022), Standard Emergency Services Communications. The emergency responder communications enhancement system, where required, shall be of a type determined by the fire code official and the frequency license holder(s). This section shall not require improvement of the existing public safety communication systems.

#### Exceptions:

- ~~((1. Where approved by the building official and the fire code official, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained instead of an approved radio coverage system.~~
- ~~((2. Where it is determined by the fire code official that the radio coverage system is not needed.))~~
1. Buildings and areas of buildings that have minimum radio coverage signal strength levels of the PSERN within the building in accordance with Section 510.4.1 without the use of an ERCES.
- ~~((3))~~ 2. In facilities where an emergency responder ~~((radio))~~ communication coverage system is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the *fire code official* shall have the authority to accept an automatically activated emergency responder ~~((radio))~~ communication coverage system.
3. One- and two-family dwellings and townhouses.

**[W] 510.2 Emergency responder communication ~~((coverage))~~ enhancement system in existing buildings.** Existing buildings shall be provided with *approved* in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system for emergency responders as required in Chapter 11.

**[W] 510.3 Permit required.** A construction permit for the installation of or modification to in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement systems and related equipment is required as specified in Section 105.6.4. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

#### Point of Information

PSERN will be the single operator of a county wide public radio system. Designers and contractors should be aware of PSERN's requirements for Distributed Antenna Systems, which can be found via [www.psern.org/requirements](http://www.psern.org/requirements).

**[W] 510.4 Technical requirements.** Equipment required to provide in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system shall be *listed* in accordance with UL 2524. Systems, components and equipment

required to provide the in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system shall comply with Sections 510.4.1 through 510.4.2.8.

**[W] 510.4.1 Emergency responder communication ~~((coverage))~~ enhancement system signal strength.** The building shall be considered to have an acceptable in-building, ~~((two-way))~~ emergency responder communication enhancement system ~~((coverage))~~ where signal strength measurements in 95 percent of all areas and 99 percent of areas designated as *critical areas* by the *fire code official* on each floor of the building meet the signal strength requirements in Sections 510.4.1.1 through 510.4.1.3.

**[W] 510.4.1.1 Minimum signal strength into the building.** The minimum inbound signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the *fire code official*. The inbound signal level shall be a ~~((minimum))~~ minimum of -95dBm ~~((throughout))~~ in 95 percent of the coverage area and 99 percent in critical areas and sufficient to provide not less than a Delivered Audio Quality (DAQ) of 3.0 or an equivalent Signal-to-Interference-Plus-Noise Ratio (SINR) applicable to the technology for either analog or digital signals.

**[S] 510.4.1.2 Minimum signal strength out of the building.** The minimum outbound signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the *fire code official*. The outbound signal level shall be sufficient to provide not less than a DAQ of 3.0 or an equivalent SINR applicable to the technology for either analog or digital signals.

**Exception:** Critical areas, such as the *fire command center(s)*, the *fire pump room(s)*, *interior exit stairways*, *exit passageways*, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations, and other areas required by the *fire code official*, shall be provided with 99 percent floor area radio coverage.

**[S] 510.4.1.3 System performance.** Signal strength shall be sufficient to meet the requirements of the applications being utilized by public safety for emergency operations through the coverage area as specified by the ~~((fire code official))~~ PSERN in Section 510.4.2.2.

**Point of Information**

When determining if the minimum signal strength referenced in Section 510.4.1.1 exists at a subject building, the signal strength shall be measured at any point on the exterior of the building up to the highest point on the roof.

**[W][S] 510.4.2 System design.** The in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system shall be designed in accordance with Sections 510.4.2.1 through 510.4.2.8 and NFPA ~~((1221))~~ 1225-2022.

**[W][S] 510.4.2.1 Amplification systems and components.** Buildings and structures that cannot support the required level of in-building, ~~((two-way))~~ emergency responder communication coverage shall be equipped with systems and components to enhance the radio signals and achieve the required level of in-building, ~~((two-way))~~ emergency responder communication coverage specified in Sections 510.4.1 through 510.4.1.3. In-building, ~~((two-way))~~ emergency responder communication enhancement systems utilizing radio-frequency-emitting devices and cabling shall be ~~((approved))~~ allowed by the ~~((fire code official))~~ PSERN. Prior to installation, all RF-emitting devices shall have the certification of the ~~((radio licensing authority))~~ PSERN and be suitable for public safety use.

**[W][S] 510.4.2.2 Technical criteria.** The ~~((fire code official))~~ PSERN shall ~~((maintain a document providing the specific technical information and requirements for the in-building, two-way emergency responder communication coverage system. This document shall contain, but not be limited to,))~~ provide the various frequencies required, the location of radio sites, the effective radiated power of radio sites, the maximum propagation delay in microseconds, the applications being used and other supporting technical information necessary for system design upon request by the building owner or owner's representative.

**[W][S] 510.4.2.3 ~~((Standby power))~~ Power supply sources.** In-building, ~~((two-way))~~ emergency responder communication ~~((radio))~~ enhancement coverage systems shall be provided with dedicated standby batteries or provided with 2-hour standby batteries and connected to the facility generator power system in accordance with Section 1203. The legally required standby power supply shall be capable of operating the in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system at 100-percent system capacity for a duration of not less than 12 hours.

**[W][S] 510.4.2.4 Signal booster requirements.** If used, signal boosters shall meet the following requirements:

1. All signal booster components shall be contained in a National Electrical Manufacturer's Association (NEMA) 4, IP66-type waterproof cabinet or equivalent.

**Exception:** Listed battery systems that are contained in integrated battery cabinets.

2. Battery systems used for the emergency power source shall be contained in a NEMA 3R or higher-rated cabinet, IP65-type waterproof cabinet or equivalent.

**Exception:** Listed battery systems that are contained in integrated battery cabinets.

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3. Equipment shall have FCC or other radio licensing authority certification and be suitable for public safety use prior to installation.
4. Where a donor antenna exists, isolation shall be maintained between the donor antenna and all inside antennas to not less than 20dB greater than the system gain under all operating conditions.
5. ~~((Active RF-emitting devices))~~ Bi-directional amplifiers (BDA) used for in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement systems shall ~~((have))~~ be fitted with ~~((built-in))~~ anti-oscillation detection and control circuitry and per-channel AGC.
6. The installation of amplification systems or enhancement systems that operate on or provide the means to cause interference on any in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system network shall be coordinated and approved by the ~~((fire code official))~~ PSEARN.
7. Unless otherwise approved by the PSEARN, only channelized signal boosters shall be permitted.

**Exception:** Broadband BDAs may be utilized when specifically authorized in writing by the PSEARN.

### **Point of Information**

BDAs must also comply with PSEARN's (www.psearn.org/requirements) detailed requirements, which include channelized, minimum of 28 channels, supporting analog, P25 Phase I (FDMA), and P25 Phase II (TDMA).

**[W][S] 510.4.2.5 System monitoring.** The in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system shall ~~((be monitored by a listed fire alarm control unit, or where approved by the fire code official, shall sound an audible signal at a constantly attended on-site location))~~ include automatic supervisory and trouble signals that are monitored by a supervisory service and are annunciated by the fire alarm system in accordance with NFPA 72. ((Automatic supervisory signals shall include the)) The following conditions shall be separately annunciated by the fire alarm system, or, if the status of each of the following conditions is individually displayed on a dedicated panel on the in-building, emergency responder communication enhancement system, a single automatic supervisory signal may be annunciated on the fire alarm system indicating deficiencies of the in-building, emergency responder communication enhancement system:

1. Loss of normal AC power supply.
2. System battery charger(s) failure.
3. Malfunction of the donor antenna(s).
4. Failure of active RF-emitting device(s).
5. Low-battery capacity at 70-percent reduction of operating capacity.
6. ~~((Failure of critical system components))~~ Active system component malfunction.
7. ~~((The))~~ Malfunction of the communications link between the fire alarm system and the in-building, ((two-way)) emergency responder communication ((coverage)) enhancement system.
8. ~~Oscillation of active RF-emitting device(s).))~~

**[W] 510.4.2.6 Additional frequencies and change of frequencies.** The in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system shall be capable of modification or expansion in the event frequency changes are required by the FCC or other radio licensing authority, or additional frequencies are made available by the FCC or other radio licensing authority.

**[W] 510.4.2.7 Design documents.** The *fire code official* shall have the authority to require “as-built” design documents and specifications for in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement systems. The documents shall be in a format acceptable to the *fire code official*.

**[W] 510.4.2.8 Radio communication antenna density.** Systems shall be engineered to minimize the near-far effect. In-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system designs shall include sufficient antenna density to address reduced gain conditions.

**Exception:** Systems where all portable devices within the same band use active power control features.

**[W][S] 510.5 Installation requirements.** The installation of the in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system shall be in accordance with NFPA ~~((4224))~~ 1225 and Sections ~~((510.5.2))~~ 510.5.1 through ((510.5.5)) 510.5.7.

**[W][S] 510.5.1 Mounting of the donor antenna(s).** To maintain proper alignment with the system designed donor site, donor antennas shall be permanently affixed on the highest possible position on the building or where ~~((approved, mounted on a movable sled with a))~~ approved by the PSEARN. A clearly visible sign stating “MOVEMENT OR REPOSITIONING OF THIS ANTENNA IS PROHIBITED WITHOUT APPROVAL FROM THE ~~((FIRE CODE OFFICIAL))~~ PUGET



SOUND EMERGENCY RADIO NETWORK (PSERN).” shall be posted. The antenna installation shall be in accordance with the applicable requirements in the *International Building Code* for weather protection of the building envelope.

**[S] 510.5.2 Approval prior to installation.** Amplification systems capable of operating on frequencies licensed to any public safety agency by the FCC or other radio licensing authority shall not be installed without prior coordination and approval of the ~~((fire code official))~~ PSERN.

**[W] 510.5.3 Minimum qualifications of personnel.** The minimum qualifications of the system designer and lead ~~((installation))~~ acceptance test personnel shall include both of the following:

1. A valid FCC-issued general radio telephone operators license.
2. Certification of in-building system training issued by an *approved* organization or *approved* school, or a certificate issued by the manufacturer of the equipment being installed.

~~((These qualifications shall not be required where demonstration of adequate skills and experience satisfactory to the fire code official is provided.))~~

**[W][S] 510.5.4 Acceptance test procedure and system certification.** Where an in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system is required, and upon completion of installation, the building owner shall have the radio system tested to verify that two-way coverage on each floor of the building is ~~((not less than 95 percent))~~ in accordance with Section 510.4.1. The test procedure shall be conducted as follows:

1. Talk-back testing from a site to the PSERN shall use Seattle Fire Department radio(s) and be witnessed by a representative of the Seattle Fire Department.
- ~~((2.))~~ 2. Each floor of the building shall be divided into a grid of 20 approximately equal test areas, with a maximum test area size of 6,400 square feet (595 m<sup>2</sup>). Where the floor area exceeds 128,000 square feet (11 892 m<sup>2</sup>), the floor shall be divided into as many approximately equal test areas as needed, such that no test area exceeds the maximum square footage allowed for a test area.
- ~~((2.))~~ The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency’s radio communications system or equipment *approved* by the fire code official.
3. Coverage testing of signal strength shall be conducted using a calibrated spectrum analyzer for each of the test grids. A diagram of this testing shall be created for each floor where coverage is provided, indicating the testing grid used for the test in Section 510.5.4(2), and including signal strengths and frequencies for each test area. Indicate all critical areas.
4. Functional talk-back testing shall be conducted using two calibrated portable radios of the latest brand and model used by the agency’s radio communications system or other equipment approved by the fire code official. Testing shall use Digital Audible Quality (DAQ) metrics, where a passing result is a DAQ of 3 or higher. Communications between handsets shall be tested and recorded in the grid square diagram required by Section 510.5.4(2); each grid square on each floor; between each critical area and a radio outside the building; between each critical area and the fire command center or fire alarm control panel; between each landing in each stairwell and the fire command center or fire alarm panel.
- ~~((3))~~ 5. Failure of more than ~~((one))~~ 5 percent of the test areas on any floor shall result in failure of the test.

**Exception:** Critical areas shall be provided with 99 percent floor area coverage.

- ~~((4))~~ 6. In the event that ~~((two))~~ 10 percent of the test areas on any floor fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal test areas. Failure of not more than ~~((two))~~ 10 percent of nonadjacent test areas on any floor shall not result in failure of the test. If the system fails the 40-area test, the system shall be altered to meet the 95-percent coverage requirement and 99-percent floor area coverage requirement in critical areas.

#### **510.5.4 Point of Information**

In accordance with Section 510.4.1, emergency responder communication enhancement signal strength coverage requirements shall be located in 95 percent of all areas on each floor of a building. For the purposes of Section 510.5.4(5), the Seattle Fire Department shall consider failure of more than 5 percent of test areas on any floor as resulting in failure of the test. For the purposes of Section 510.5.4(6), when systems fail the 40-area test, the Seattle Fire Department shall require system alterations to meet 95 percent coverage.

- ~~((5))~~ 7. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the ~~((public agency’s radio communications system))~~ PSERN. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered to be a failure of that test area. Additional test locations shall not be permitted.

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- ((6)) 8. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building *owner* so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building *owner* shall be required to rerun the acceptance test to reestablish the gain values.
- ((7)) 9. As part of the installation, a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and at subsequent annual inspections.
- ((8)) 10. Systems shall be tested using two portable radios simultaneously conducting subjective voice quality checks. One portable radio shall be positioned not greater than 10 feet (3048 mm) from the indoor antenna. The second portable radio shall be positioned at a distance that represents the farthest distance from any indoor antenna. With both portable radios simultaneously keyed up on different frequencies within the same band, subjective audio testing shall be conducted and comply with DAQ levels as specified in Sections 510.4.1.1 and 510.4.1.2.
11. **Documentation maintained on premises.** At the conclusion of the testing, and prior to issuance of the building certificate of occupancy, the building owner or owner's representative shall place a copy of the following records in the Distributed Antenna System enclosure or the building engineer's office. The records shall be available to the *fire code official* and maintained by the building owner for the life of the system:
- A certification letter stating that the emergency responder enhancement coverage system has been installed and tested in accordance with this code, and that the system is complete and fully functional.
  - The grid square diagram created as part of testing in Sections 510.5.4(2) and 510.5.4(3).
  - Data sheets and/or manufacturer specifications for the emergency responder enhancement coverage system equipment; back up battery; and charging system (if utilized).
  - A diagram showing device locations and wiring schematic.
  - A copy of the electrical permit.
12. **Acceptance test reporting to fire code official.** At the conclusion of the testing, and prior to issuance of the building certificate of occupancy, the building owner or owner's representative shall submit to the *fire code official* a report of the acceptance test by way of the department's third-party vendor, [thecomplianceengine.com](http://thecomplianceengine.com).

[W] 510.5.5 **FCC compliance.** The in-building, ((two-way)) emergency responder communication ((coverage)) enhancement system installation and components shall comply with all applicable federal regulations including, but not limited to, FCC 47 CFR Part 90.219.

[W] 510.5.6 **Wiring.** The backbone, antenna distribution, radiating, or any fiber-optic cables shall be rated as plenum cables. The backbone cables shall be connected to the antenna distribution, radiating, or copper cables using hybrid coupler devices of a value determined by the overall design. Backbone cables shall be routed through an enclosure that matches the building's required fire-resistance rating for shafts or interior exit stairways. The connection between the backbone cable and the antenna cables shall be made within an enclosure that matches the building's fire-resistance rating for shafts or interior exit stairways, and passage of the antenna distribution cable in and out of the enclosure shall be protected as a penetration per the *International Building Code*.

[W] 510.5.7 **Identification signs.** *Emergency responder radio coverage systems* shall be identified by an *approved sign* located on or near the fire alarm control panel or other *approved location* stating "This building is equipped with an Emergency Responder Enhancement Coverage System. Control Equipment located in..." or as *approved by the fire code official*. A sign stating "Emergency Responder Enhancement Coverage System Equipment" shall be placed on or adjacent to the door of the room containing the main system components.

[W] 510.6 **Maintenance.** The in-building, ((two-way)) emergency responder communication ((coverage)) enhancement system shall be maintained operational at all times in accordance with Sections 510.6.1 through 510.6.4.

[W][S] 510.6.1 **Testing and proof of compliance.** The *owner* of the building or *owner's* authorized agent shall have the in-building, ((two-way)) emergency responder communication ((coverage)) enhancement system inspected and tested annually or where structural changes occur, including additions or remodels that could materially change the original field performance tests. Testing shall consist of the following subsections (1) through (7):

- In-building coverage test as required by the fire code official as described in Section 510.5.4 or 510.6.1.1.  
**Exception:** Group R Occupancy annual testing is not required within dwelling units.
- Signal boosters shall be tested to verify that the gain/output level is the same as it was upon initial installation and acceptance or set to optimize the performance of the system.
- Backup batteries and power supplies shall be tested under load of a period of 1 hour to verify that they will properly operate during an actual power outage. If within the 1-hour test period the battery exhibits symptoms of failure, the test shall be extended for additional 1-hour periods until the integrity of the battery can be determined.
- All other active components shall be checked to verify operation within the manufacturer's specifications.

5. If a fire alarm system is present in the building, a test shall be conducted to verify that the fire alarm system is properly supervising the emergency responder communication system as required in Section 510.4.2.5. The test is performed by simulating alarms to the fire alarm control panel. The certifications in Section 510.5.3 are sufficient for the personnel performing this testing.
6. At the conclusion of testing, a record of the inspection and maintenance along with an updated grid diagram of each floor showing tested strengths in each grid square and each critical area shall be added to the documentation maintained on the premises in accordance with Section 510.5.4.
- ~~(5)~~ 7. At the conclusion of the testing, a report, which shall verify compliance with Section ~~(510.5.4)~~ 510.6.1, shall be submitted to the fire code official by way of the department's third-part vendor, thecomplianceengine.com.

**[W] 510.6.1.1 Alternative in-building coverage test.** When the comprehensive test documentation required by Section 510.5.4 is available, or the most recent full five-year test results are available if the system is older than six years, the in-building coverage test required by the fire code official in Section 510.6.1(1), may be conducted as follows:

1. Functional talk-back testing shall be conducted using two calibrated portable radios of the latest brand and model used by the agency's radio communications system or other equipment approved by the fire code official. Testing shall use Digital Audible Quality (DAQ) metrics, where a passing result is a DAQ of 3 or higher. Communications between handsets in the following locations shall be tested: between the fire command center or fire alarm control panel and a location outside the building; between the fire alarm control panel and each landing in each stairwell.
2. Coverage testing of signal strength shall be conducted using a calibrated spectrum analyzer for:
  - (a) Three grid areas per floor. The three grid areas to be tested on each floor are the three grid areas with poorest performance in the acceptance test or the most recent annual test, whichever is more recent; and
  - (b) Each of the critical areas identified in acceptance test documentation required by Section 510.5.3, or as modified by the fire code official; and
  - (c) One grid square per serving antenna.
3. The test area boundaries shall not deviate from the areas established at the time of the acceptance test, or as modified by the fire code official. The building shall be considered to have acceptable emergency responder radio coverage when the required signal strength requirements in Sections 510.4.1.1 and 510.4.1.2 are located in 95 percent of all areas on each floor of the building and 99 percent in critical areas, and any non-functional serving antenna are repaired to function within normal ranges. If the documentation of the acceptance test or most recent previous annual test results are not available or acceptable to the fire code official, the radio coverage verification testing described in Section 510.5.4 shall be conducted.

#### **Point of Information**

The alternative in-building coverage test provides an alternative testing protocol for the in-building coverage test in subsection 510.6.1(1). There is no change or alternative to annual testing requirements enumerated in subsections 510.6.1(2) through (7), which must be performed at the time of each annual test.

**[W][S] 510.6.2 Additional frequencies.** The building owner shall modify or expand the in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system at ~~((his or her))~~ their expense in the event frequency changes are required by the FCC or other radio licensing authority, or additional frequencies are made available by the FCC ~~((or other radio licensing authority))~~ or *PSERN*. Prior approval of an in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system on previous frequencies does not exempt this section.

**[W] 510.6.3 Nonpublic safety system.** Where other nonpublic safety amplification systems installed in buildings reduce the performance or cause interference with the in-building, ~~((two-way))~~ emergency responder communication ~~((coverage))~~ enhancement system, the nonpublic safety amplification system shall be corrected or removed.

**[W][S] 510.6.4 Field testing.** ~~((Agency))~~ Seattle Fire Department personnel shall have the right to enter onto the property at any reasonable time to conduct field testing to verify the required level of radio coverage or to disable a system adversely impacting the emergency responder communication enhancement system in the region.

**603.6.1 Application and use.** Extension cords shall be plugged directly into an *approved* receptacle, relocatable power tap or current tap and, except for *approved* multiplug extension cords, shall serve only one portable appliance.

**603.6.2 Ampacity.** The ampacity of the extension cords shall be not less than the rated capacity of the portable appliance supplied by the cord.

**603.6.3 Maintenance.** Extension cords shall be maintained in good condition without splices, deterioration or damage.

**603.6.4 Grounding.** Extension cords shall be grounded where serving grounded portable appliances.

**603.7 Electrical motors.** Electrical motors shall be maintained free from excessive accumulations of oil, dirt, waste and debris.

**603.8 Temporary wiring.** The use of temporary wiring for electrical power and lighting installations shall not exceed a period of 90 days. Temporary wiring methods shall meet the applicable provisions of NFPA 70.

**Exception:** Temporary wiring for electrical power and lighting installations complying with the applicable provisions of NFPA 70 is permitted during periods of construction, remodeling, repair or demolition of buildings, structures, equipment or similar activities.

**603.8.1 Attachment to structures.** Temporary wiring attached to a structure shall be protected from physical damage and supported on insulators spaced not more than 10 feet (3048 mm) apart.

**603.9 Portable, electric space heaters.** Where not prohibited by other sections of this code, portable, electric space heaters shall be permitted to be used in all occupancies in accordance with Sections 603.9.1 through 603.9.5.

**603.9.1 Listed and labeled.** Only *listed* and *labeled* portable, electric space heaters shall be used.

**603.9.2 Power supply.** Portable, electric space heaters shall be plugged directly into an *approved* receptacle.

**603.9.3 Extension cords.** Portable, electric space heaters shall not be plugged into extension cords.

**603.9.4 Prohibited areas.** Portable, electric space heaters shall not be operated within 3 feet (914 mm) of any combustible materials. Portable, electric space heaters shall be operated only in locations for which they are *listed*.

**603.9.5 Group I-2 occupancies and ambulatory care facilities.** Where used in Group I-2 and ambulatory care facilities, portable, electric space heaters shall be limited to those having a heating element that cannot exceed a temperature of 212°F (100°C), and such heaters shall only be used in nonsleeping staff and employee areas.

**603.10 Abandoned wiring in plenums.** Abandoned cables in plenums that are able to be accessed without causing damage, or requiring demolition to the building, shall be tagged for future use or shall be removed.

## SECTION 604 ELEVATOR OPERATION, MAINTENANCE AND FIRE SERVICE KEYS

**604.1 General.** Where elevators and conveying systems are installed, they shall comply with Chapter 30 of the *International Building Code* and Sections 604.2 through 604.7 of this code.

[S] **604.2 Emergency operation.** Existing elevators with a travel distance of 25 feet (7620 mm) or more shall comply with the requirements in Chapter 11. New elevators shall be provided with Phase I emergency recall operation and Phase II emergency in-car operation in accordance with ASME A17.1/CSA B44 and the *International Building Code*.

**604.3 Standby power.** In buildings and structures where standby power is required or furnished to operate an elevator, standby power shall be provided in accordance with Section 1203. Operation of the system shall be in accordance with Sections 604.3.1 through 604.3.4.

**604.3.1 Manual transfer.** Standby power shall be manually transferable to all elevators in each bank.

**604.3.2 One elevator.** Where only one elevator is installed, the elevator shall automatically transfer to standby power within 60 seconds after failure of normal power.

**604.3.3 Two or more elevators.** Where two or more elevators are controlled by a common operating system, all elevators shall automatically transfer to standby power within 60 seconds after failure of normal power where the standby power source is of sufficient capacity to operate all elevators at the same time. Where the standby power source is not of sufficient capacity to operate all elevators at the same time, all elevators shall transfer to standby power in sequence, return to the designated landing and disconnect from the standby power source. After all elevators have been returned to the designated level, not less than one elevator shall remain operable from the standby power source.

**604.3.4 Machine room ventilation.** Where standby power is connected to elevators, the machine room ventilation or air conditioning shall be connected to the standby power source.

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**[BE] 604.4 Emergency signs.** An *approved* pictorial sign of a standardized design shall be posted adjacent to each elevator call station on all floors instructing occupants to use the exit *stairways* and not to use the elevators in case of fire. The sign shall read: “IN FIRE EMERGENCY, DO NOT USE ELEVATOR. USE EXIT STAIRS.”

### Exceptions:

1. The emergency sign shall not be required for elevators that are part of an accessible *means of egress* complying with Section 1009.4.
2. The emergency sign shall not be required for elevators that are used for occupant self-evacuation in accordance with Section ~~((3008))~~ 403.6.2 of the *International Building Code*.

**604.5 Maintenance of elevators.** Elevator features and lobbies required by Section 3006 of the *International Building Code* shall be maintained in accordance with Sections 604.5.1 through 604.5.4.

**604.5.1 Fire service access elevators and lobbies.** Where fire service access elevators are required by Section ~~((3007))~~ 403.6.1 of the *International Building Code*, fire service access elevator fire protection and safety features shall be maintained and lobbies required by Section 3007 of the *International Building Code* shall be maintained free of storage and furniture.

**604.5.2 Occupant evacuation elevators and lobbies.** Where occupant evacuation elevators are provided in accordance with Section ~~((3008))~~ 403.6.2 of the *International Building Code*, occupant evacuation elevator fire protection and safety features shall be maintained and lobbies required by Section ~~((3008))~~ 403.6.1 of the *International Building Code* shall be maintained free of storage and furniture.

**604.5.3 Storage within elevator lobbies.** Where hoistway opening protection is required by Section 3006.2 of the *International Building Code*, elevator lobbies shall be maintained free of storage.

**604.5.4 Water protection of hoistway enclosures.** Methods to prevent water from infiltrating into a hoistway enclosure required by Sections ~~((3007.3))~~ 403.6.1.2 and ~~((3008.3))~~ 403.6.2.4 of the *International Building Code* shall be maintained.

**604.6 Elevator keys.** All elevators shall be provided with elevator car door and fire-fighter service keys in accordance with Sections 604.6.1 through 604.6.2.4.

**[S] 604.6.1 Elevator key location.** Keys for the elevator car doors and fire-fighter service keys shall be kept in an ~~((approved location for immediate use by the fire department))~~ access key box in accordance with Section 506.1.1.

**[S] 604.6.2 Standardized fire service elevator keys.** Buildings with elevators equipped with Phase I emergency recall, Phase II emergency in-car operation, or a fire service access elevator shall be equipped to operate with a standardized fire service elevator key *approved* by the *fire code official* or a standardized key in accordance with ASME A17.1/CSA B44.

~~((Exception: The owner shall be permitted to place the building's nonstandardized fire service elevator keys in a key box installed in accordance with Section 506.1.2.))~~

**604.6.2.1 Requirements for standardized fire service elevator keys.** Standardized fire service elevator keys shall comply with all of the following:

1. All fire service elevator keys within the jurisdiction shall be uniform and *approved* in accordance with Section 604.6.2. Keys shall be cut to a uniform key code.
2. Fire service elevator keys shall be of a patent-protected design to prevent unauthorized duplication.
3. Fire service elevator keys shall be factory restricted by the manufacturer to prevent the unauthorized distribution of key blanks. Uncut key blanks shall not be permitted to leave the factory.
4. Fire service elevator keys subject to these rules shall be engraved with the words “DO NOT DUPLICATE.”

**604.6.2.2 Access to standardized fire service keys.** Access to standardized fire service elevator keys shall be restricted to the following:

1. Elevator owners or their authorized agents.
2. Elevator contractors.
3. Elevator inspectors of the jurisdiction.
4. *Fire code officials* of the jurisdiction.
5. The fire department and other emergency response agencies designated by the *fire code official*.

**604.6.2.3 Duplication or distribution of keys.** A person shall not duplicate a standardized fire service elevator key or issue, give, or sell a duplicated key unless in accordance with this code.

**604.6.2.4 Responsibility to provide keys.** The building *owner* shall provide up to three standardized fire service elevator keys where required by the *fire code official*, upon installation of a standardized fire service key switch or switches in the building.

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**605.2.1.3 Decorative shrouds.** Decorative shrouds installed at the termination of factory-built chimneys or vents shall be removed except where such shrouds are *listed* and *labeled* for use with the specific factory-built chimney system and are installed in accordance with the chimney or vent manufacturer's instructions and the *International Mechanical Code* or *International Fuel Gas Code*.

**605.2.1.4 Factory-built chimney and vent systems.** Existing factory-built chimneys and vent systems that are damaged, corroded or improperly supported shall be repaired or replaced in accordance with the *International Mechanical Code*.

**605.2.1.5 Connectors.** Existing chimney and vent connectors that are damaged, corroded or improperly supported shall be repaired or replaced in accordance with the *International Mechanical Code*.

**605.3 Chimneys and vents.** Masonry chimneys shall be constructed in accordance with the *International Building Code*. Factory-built chimneys and vent systems serving solid-fuel-fired appliances or oil-fired appliances shall be installed in accordance with the *International Mechanical Code*. Metal chimneys shall be constructed and installed in accordance with the *International Mechanical Code*. Factory-built chimneys and vent systems serving gas-fired appliances shall be installed in accordance with the *International Fuel Gas Code*.

**605.4 Fuel oil storage systems.** Fuel oil storage systems for building heating systems shall be installed and maintained in accordance with this code. Tanks and fuel-oil piping systems shall be installed in accordance with Chapter 13 of the *International Mechanical Code*.

### Point of Information

Due to the high prevalence of leaking oil storage tanks in Seattle and because many may be beyond their useful life, posing a hazard to people, property, and the environment, Seattle Fire Department may propose a retroactive code change applying storage tank design standards to storage tanks that are of a specific vintage (e.g., 20 years of age or older) in future editions of this code.

**605.4.1 Fuel oil storage in outside, above-ground tanks.** Where connected to a fuel-oil piping system, the maximum amount of fuel oil storage allowed outside above ground without additional protection shall be 660 gallons (2498 L). The storage of fuel oil above ground in quantities exceeding 660 gallons (2498 L) shall comply with NFPA 31.

**[W] 605.4.1.1 Approval.** Outdoor fuel oil storage tanks shall be in accordance with UL 80, UL 142, UL 142A, or UL 2085.

**605.4.2 Fuel oil storage inside buildings.** Fuel oil storage inside buildings shall comply with Sections 605.4.2.2 through 605.4.2.8 or Chapter 57.

**[W] 605.4.2.1 Approval.** Indoor fuel oil storage tanks shall be in accordance with UL 80, UL 142, UL 142A, or UL 2085.

**605.4.2.2 Quantity limits.** One or more fuel oil storage tanks containing Class II or III *combustible liquid* shall be permitted in a building. The aggregate capacity of all tanks shall not exceed the following:

1. 660 gallons (2498 L) in unsprinklered buildings, where stored in a tank complying with UL 80, UL 142, UL 142A, or UL 2085.
2. 1,320 gallons (4996 L) in buildings equipped with an *automatic sprinkler* system in accordance with Section 903.3.1.1, where stored in a tank complying with UL 142 or UL 142A. The tank shall be *listed* as a secondary containment tank, and the secondary containment shall be monitored visually or automatically.
3. 3,000 gallons (11 356 L) in buildings equipped with an automatic sprinkler system in accordance with Section 903.3.1.1, where stored in protected above-ground tanks complying with UL 2085 and Section 5704.2.9.7. The tank shall be *listed* as a secondary containment tank, as required by UL 2085, and the secondary containment shall be monitored visually or automatically.

**605.4.2.3 Restricted use and connection.** Tanks installed in accordance with Section 605.4.2 shall be used only to supply fuel oil to fuel-burning equipment, generators or fire pumps installed in accordance with Section 605.4.2.5. Connections between tanks and equipment supplied by such tanks shall be made using closed piping systems in accordance with the *International Mechanical Code*.

**605.4.2.4 Applicability of maximum allowable quantity and control area requirements.** The quantity of *combustible liquid* stored in tanks complying with Section 605.4.2 shall not be counted towards the maximum allowable quantity set forth in Table 5003.1.1(1), and such tanks shall not be required to be located in a *control area*.

**605.4.2.5 Installation.** Tanks and piping systems shall be installed in accordance with Section 915 and Chapter 13, both of the *International Mechanical Code*, as applicable.

**605.4.2.6 Separation.** Rooms containing fuel oil tanks for internal combustion engines shall be separated from the remainder of the building by *fire barriers, horizontal assemblies*, or both, with a minimum 1-hour *fire-resistance rating* with 1-hour fire-protection-rated *opening protectives* constructed in accordance with the *International Building Code*.

**Exception:** Rooms containing protected above-ground tanks complying with Section 5704.2.9.7 shall not be required to be separated from surrounding areas.

**605.4.2.7 Spill containment.** Tanks exceeding 60-gallon (227 L) capacity or an aggregate capacity of 1,000 gallons (3785 L) that are not provided with integral secondary containment shall be provided with spill containment sized to contain a release from the largest tank.

**605.4.2.8 Tanks in basements.** Tanks in *basements* shall be located not more than two stories below *grade plane*.

**605.4.3 Underground storage of fuel oil.** The storage of fuel oil in underground storage tanks shall comply with UL 58 or UL 1316 and be installed in accordance with NFPA 31.

**605.5 Portable unvented heaters.** Portable unvented fuel-fired heating equipment shall be prohibited in occupancies in Groups A, E, I, R-1, R-2, R-3 and R-4 and ambulatory care facilities.

**Exceptions:**

1. Portable unvented fuel-fired heaters *listed* in accordance with UL 647 are permitted to be used in one- and two-family dwellings, where operated and maintained in accordance with the manufacturer's instructions.
2. Portable outdoor gas-fired heating appliances in accordance with Section 605.5.2.

**605.5.1 Prohibited locations.** Unvented fuel-fired heating equipment shall not be located in, or obtain combustion air from, any of the following rooms or spaces: sleeping rooms, bathrooms, toilet rooms or storage closets.

**605.5.2 Portable outdoor gas-fired heating appliances.** Portable gas-fired heating appliances located outdoors shall be in accordance with Sections 605.5.2.1 through 605.5.2.3.4.

**605.5.2.1 Location.** Portable outdoor gas-fired heating appliances shall be used and located in accordance with Sections 605.5.2.1.1 through 605.5.2.1.4.

**605.5.2.1.1 Prohibited locations.** The storage or use of portable outdoor gas-fired heating appliances is prohibited in any of the following locations:

1. Inside of any occupancy where connected to the fuel gas container.
2. Inside of tents, canopies and membrane structures.
3. On exterior balconies.

**Exception:** As permitted in Chapter 61.

**605.5.2.1.2 Clearance to buildings.** Portable outdoor gas-fired heating appliances shall be located not less than 5 feet (1524 mm) from buildings.

**605.5.2.1.3 Clearance to combustible materials.** Portable outdoor gas-fired heating appliances shall not be located beneath, or closer than 5 feet (1524 mm) to combustible decorations and combustible overhangs, awnings, sunshades or similar combustible attachments to buildings.

**605.5.2.1.4 Proximity to exits.** Portable outdoor gas-fired heating appliances shall not be located within 5 feet (1524 mm) of *exits* or *exit discharges*.

**605.5.2.2 Use and operation.** Portable outdoor gas-fired heating appliances shall be used and operated in accordance with Sections 605.5.2.2.1 through 605.5.2.2.4.

**605.5.2.2.1 Listing and approval.** Only *listed* and *approved* portable outdoor gas-fired heating appliances utilizing a fuel gas container that is integral to the appliance shall be used. Portable outdoor gas-fired heating appliances shall be *listed* and *labeled* in accordance with ANSI Z83.26/CSA 2.37.

**605.5.2.2.2 Use and maintenance.** Portable outdoor gas-fired heating appliances shall be used and maintained in accordance with the manufacturer's instructions.

**605.5.2.2.3 Tip-over switch.** Portable outdoor gas-fired heating appliances shall be equipped with a tilt or tip-over switch that automatically shuts off the flow of gas if the appliance is tilted more than 15 degrees (0.26 rad) from the vertical.

**605.5.2.2.4 Guard against contact.** The heating element or combustion chamber of portable outdoor gas-fired heating appliances shall be permanently guarded so as to prevent accidental contact by persons or material.

**605.5.2.3 Gas containers.** Fuel gas containers for portable outdoor gas-fired heating appliances shall comply with Sections 605.5.2.3.1 through 605.5.2.3.4.

**605.5.2.3.1 Approved containers.** Only *approved* DOTn or ASME gas containers shall be used.

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**605.5.2.3.2 Container replacement.** Replacement of fuel gas containers in portable outdoor gas-fired heating appliances shall not be conducted while the public is present.

**605.5.2.3.3 Container capacity.** The maximum individual capacity of gas containers used in connection with portable outdoor gas-fired heating appliances shall not exceed 20 pounds (9 kg).

**[S] 605.5.2.3.4 Indoor storage prohibited.** Gas containers shall ~~((not))~~ be stored ~~((inside))~~ outside of buildings ~~((except))~~ in accordance with ~~((Section 6109.9))~~ the provisions of Sections 6109.12 through 6109.15.

**605.6 Heating appliances.** Heating appliances shall be *listed* and shall comply with Sections 605.6.1 and 605.6.2.

**605.6.1 Guard against contact.** The heating element or combustion chamber shall be permanently guarded so as to prevent accidental contact by persons or material.

**605.6.2 Heating appliance installation and maintenance.** Heating appliances shall be installed and maintained in accordance with the manufacturer's instructions, the *International Building Code*, the *International Fuel Gas Code*, the *International Mechanical Code* and NFPA 70.

**605.7 Unauthorized operation.** It shall be a violation of this code for any person, user, firm or agent to continue the utilization of any device or appliance (the operation of which has been discontinued or ordered discontinued in accordance with Section 605.2) unless written authority to resume operation is given by the *fire code official*. Removing or breaking the means by which operation of the device is prevented shall be a violation of this code.

**605.8 Incinerators.** Commercial, industrial and residential-type incinerators and chimneys shall be constructed in accordance with the *International Building Code*, the *International Fuel Gas Code* and the *International Mechanical Code*.

**605.8.1 Residential incinerators.** Residential incinerators shall be *listed* and *labeled* in accordance with UL 791.

**605.8.2 Spark arrestor.** Incinerators shall be equipped with an effective means for arresting sparks.

**605.8.3 Restrictions.** Where the *fire code official* determines that burning in incinerators located within 500 feet (152 m) of mountainous, brush or grass-covered areas will create an undue fire hazard because of atmospheric conditions, such burning shall be prohibited.

**605.8.4 Time of burning.** Burning shall take place only during *approved* hours.

**605.8.5 Discontinuance.** The *fire code official* is authorized to require incinerator use to be discontinued immediately if the *fire code official* determines that smoke emissions are offensive to occupants of surrounding property or if the use of incinerators is determined by the *fire code official* to constitute a hazardous condition.

**605.8.6 Flue-fed incinerators in Group I-2.** In Group I-2 occupancies, the continued use of existing flue-fed incinerators is prohibited.

**605.8.7 Incinerator inspections in Group I-2.** Incinerators in Group I-2 occupancies shall be inspected not less than annually in accordance with the manufacturer's instructions. Inspection records shall be maintained on the premises and made available to the *fire code official* upon request.

**605.9 Gas meters.** Above-ground gas meters, regulators and piping subject to damage shall be protected by a barrier complying with Section 312 or otherwise protected in an *approved* manner.

## SECTION 606 COMMERCIAL COOKING EQUIPMENT AND SYSTEMS

**[M] 606.1 General.** Commercial kitchen exhaust hoods shall comply with the requirements of the *International Mechanical Code*.

**[W][S][M] 606.2 Where required.** A Type I hood shall be installed at or above all commercial cooking appliances and domestic cooking appliances used for commercial purposes that produce grease-laden vapors.

### Exceptions:

1. Factory-built commercial exhaust hoods that are *listed* and *labeled* in accordance with UL 710, and installed in accordance with Section 304.1 of the *International Mechanical Code*, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5 of the *International Mechanical Code*.
2. Factory-built commercial cooking recirculating systems that are *listed* and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1 of the *International Mechanical Code*, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5 of the *International Mechanical Code*. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1 of the *International Mechanical Code*. The kitchen exhaust system shall discharge in accordance with subsection 501.3.1(3) of the *International Mechanical Code*. For the purpose of deter-



mining the floor area required to be ventilated, each individual appliance shall be considered as occupying not less than 100 square feet (9.3 m<sup>2</sup>).

3. Where cooking appliances are equipped with integral down-draft exhaust systems and such appliances and exhaust systems are *listed* and *labeled* for the application in accordance with NFPA 96, a hood shall not be required at or above them.
4. A Type I hood shall not be required for an electric cooking appliance where an *approved* testing agency provides documentation that the appliance effluent contains 5 mg/m<sup>3</sup> or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m<sup>3</sup>/s) in accordance with UL 710B.
5. A Type I hood shall not be required in an R-2 type occupancy with not more than 16 residents.

**606.2.1 Domestic cooking appliances used for commercial purposes.** Domestic cooking appliances utilized for commercial purposes shall be provided with Type I, Type II or residential hoods as required for the type of appliances and processes in accordance with Table 606.2.1 or Sections 507.2 and 507.3 of the International Mechanical Code.

**ISI TABLE 606.2.1**  
**TYPE OF HOOD REQUIRED FOR DOMESTIC COOKING APPLIANCES IN THE FOLLOWING SPACES<sup>a,b</sup>**

TYPE OF SPACE	TYPE OF COOKING	TYPE OF HOOD
Place of religious worship	1. Boiling, steaming and warming precooked food 2. Roasting, pan frying and deep frying	Residential hood <sup>c</sup> or Type II hood Type I hood
Community or party room in apartment and condominium	1. Boiling, steaming and warming precooked food 2. Roasting, pan frying and deep frying	Residential hood <sup>c</sup> or Type II hood <sup>d</sup> Type I hood
Day care	1. Boiling, steaming and warming precooked food 2. Roasting, pan frying and deep frying	Residential hood <sup>c</sup> or Type II hood <sup>d</sup> Type I hood
Dormitory, assisted living facility, nursing home	1. Boiling, steaming and warming precooked food 2. Roasting, pan frying and deep frying	Residential hood <sup>c</sup> or Type II hood Type I hood
Office lunch room	1. Boiling, steaming and warming precooked food 2. Roasting, pan frying and deep frying	Residential hood <sup>c</sup> or Type II hood <sup>d</sup> Type I hood

a. Commercial cooking appliances shall comply with Section 507.2 of the *International Mechanical Code*.

b. Requirements in this table apply to electric or gas fuel appliances only. Solid fuel appliances or charbroilers require Type I hoods.

c. Residential hood shall ventilate to the outside.

d. Type II hood required when more than one appliance is used.

**[W][S] 606.3 Operations and maintenance.** Commercial cooking systems shall be operated, inspected, and maintained in accordance with Sections 606.3.1 through 606.3.4 and Chapter 12 of NFPA 96.

**606.3.1 Ventilation system.** The ventilation system in connection with hoods shall be operated at the required rate of air movement, and grease filters *listed* and *labeled* in accordance with UL 1046 shall be in place where equipment under a kitchen grease hood is used.

**606.3.2 Grease extractors.** Where grease extractors are installed, they shall be operated when the commercial-type cooking equipment is used.

**606.3.3 Cleaning.** Hoods, grease-removal devices, fans, ducts and other appurtenances shall be cleaned at intervals as required by Sections 606.3.3.1 through 606.3.3.3.

**606.3.3.1 Inspection.** Hoods, grease-removal devices, fans, ducts and other appurtenances shall be inspected at intervals specified in Table 606.3.3.1 or as *approved* by the *fire code official*. Inspections shall be completed by qualified individuals.

**TABLE 606.3.3.1**  
**COMMERCIAL COOKING SYSTEM INSPECTION FREQUENCY**

TYPE OF COOKING OPERATIONS	FREQUENCY OF INSPECTION
High-volume cooking operations such as 24-hour cooking, charbroiling or wok cooking	3 months
Low-volume cooking operations such as places of religious worship, seasonal businesses and senior centers	12 months
Cooking operations utilizing solid fuel-burning cooking appliances	1 month
All other cooking operations	6 months

**606.3.3.2 Grease accumulation.** If during the inspection it is found that hoods, grease-removal devices, fans, ducts or other appurtenances have an accumulation of grease, such components shall be cleaned in accordance with ANSI/IFCA C10.

7 for operating procedures. Decommissioning of ammonia refrigeration systems shall comply with IAR 8, and engineering practices for existing ammonia refrigeration systems shall be in accordance with IAR 9.

**608.2 Permits.** Permits shall be obtained for refrigeration systems in accordance with Sections 105.5 and 105.6.

**[M] 608.3 Refrigerants.** The use and purity of new, recovered and reclaimed refrigerants shall be in accordance with the *International Mechanical Code*.

**[M] 608.4 Refrigerant classification.** Refrigerants shall be classified in accordance with the *International Mechanical Code*.

**[M] 608.5 Change in refrigerant type.** A change in the type of refrigerant in a refrigeration system shall be in accordance with the *International Mechanical Code*.

**608.6 Access.** Access to refrigeration systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant shall be provided for the fire department at all times as required by the *fire code official*.

**608.7 Testing of equipment.** Refrigeration equipment and systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant shall be subject to periodic testing in accordance with Section 608.7.1. Records of tests shall be maintained. Tests of emergency devices or systems required by this chapter shall be conducted by persons trained and qualified in refrigeration systems.

**608.7.1 Periodic testing.** The following emergency devices or systems shall be periodically tested in accordance with the manufacturer's instructions and as required by the *fire code official*.

1. Treatment and flaring systems.
2. Valves and appurtenances necessary to the operation of emergency refrigeration control boxes.
3. Fans and associated equipment intended to operate emergency ventilation systems.
4. Detection and alarm systems.

**608.8 Emergency signs.** Refrigeration units or systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant shall be provided with *approved* emergency signs, charts and labels in accordance with NFPA 704. Hazard signs shall be in accordance with the *International Mechanical Code* for the classification of refrigerants listed therein.

**608.9 Refrigerant detection system.** Machinery rooms shall be provided with a refrigerant detector system with an audible and visible alarm. Where ammonia is used as the refrigerant, detection shall comply with IAR 2. For refrigerants other than ammonia, refrigerant detection shall comply with Section 608.9.1.

**608.9.1 Refrigerants other than ammonia.** A detector, or a sampling tube that draws air to a detector, shall be provided at an *approved* location where refrigerant from a leak is expected to accumulate. The system shall be designed to initiate audible and visible alarms inside of and outside each entrance to the refrigerating machinery room and transmit a signal to an *approved* location where the concentration of refrigerant detected exceeds the lesser of the following:

1. The corresponding TLV-TWA values shown in the *International Mechanical Code* for the refrigerant classification.
2. Twenty-five percent of the lower flammable limit (LFL).

Detection of a refrigerant concentration exceeding the upper detection limit or 25 percent of the lower flammable limit (LFL), whichever is lower, shall stop refrigerant equipment in the machinery room in accordance with Section 608.10.1.

**608.10 Remote controls.** Where flammable refrigerants are used and compliance with Section 1106 of the *International Mechanical Code* is required, remote control of the mechanical equipment and appliances located in the machinery room as required by Sections 608.10.1 and 608.10.2 shall be provided at an *approved* location immediately outside the machinery room and adjacent to its principal entrance.

**608.10.1 Refrigeration system emergency shutoff.** A clearly identified switch of the break-glass type or with an *approved* tamper-resistant cover shall provide off-only control of refrigerant compressors, refrigerant pumps and normally closed automatic refrigerant valves located in the machinery room. Additionally, this equipment shall be automatically shut off when the refrigerant vapor concentration in the machinery room exceeds the vapor detector's upper detection limit or 25 percent of the LEL, whichever is lower.

**608.10.2 Ventilation system.** A clearly identified switch of the break-glass type or with an *approved* tamper-resistant cover shall provide on-only control of the machinery room ventilation fans.

**608.11 Emergency pressure control system.** Permanently installed refrigeration systems in machinery rooms containing more than 6.6 pounds (3 kg) of flammable, toxic or highly toxic refrigerant or ammonia shall be provided with an emergency pressure control system in accordance with Sections 608.11.1 and 608.11.2.

**608.11.1 Automatic crossover valves.** Each high- and intermediate-pressure zone in a refrigeration system shall be provided with a single automatic valve providing a crossover connection to a lower pressure zone. Automatic crossover valves shall comply with Sections 608.11.1.1 through 608.11.1.3.

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**608.11.1.1 Overpressure limit set point.** Automatic crossover valves shall be arranged to automatically relieve excess system pressure to a lower pressure zone if the pressure in a high- or intermediate-pressure zone rises to within 90 percent of the set point for emergency pressure relief devices.

**608.11.1.2 Manual operation.** Where required by the *fire code official*, automatic crossover valves shall be capable of manual operation.

**608.11.1.3 System design pressure.** Refrigeration system zones that are connected to a higher pressure zone by an automatic crossover valve shall be designed to safely contain the maximum pressure that can be achieved by interconnection of the two zones.

**608.11.2 Automatic emergency stop.** An automatic emergency stop feature shall be provided in accordance with Sections 608.11.2.1 and 608.11.2.2.

**608.11.2.1 Operation of an automatic crossover valve.** Operation of an automatic crossover valve shall cause all compressors on the affected system to immediately stop. Dedicated pressure-sensing devices located immediately adjacent to crossover valves shall be permitted as a means for determining operation of a valve. To ensure that the automatic crossover valve system provides a redundant means of stopping compressors in an overpressure condition, high-pressure cutout sensors associated with compressors shall not be used as a basis for determining operation of a crossover valve.

**608.11.2.2 Overpressure in low-pressure zone.** The lowest pressure zone in a refrigeration system shall be provided with a dedicated means of determining a rise in system pressure to within 90 percent of the set point for emergency pressure relief devices. Activation of the overpressure sensing device shall cause all compressors on the affected system to immediately stop.

**608.12 Storage, use and handling.** Flammable and combustible materials shall not be stored in machinery rooms for refrigeration systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant. Storage, use or handling of extra refrigerant or refrigerant oils shall be as required by Chapters 50, 53, 55 and 57.

**Exception:** This provision shall not apply to spare parts, tools and incidental materials necessary for the safe and proper operation and maintenance of the system.

**608.13 Discharge and termination of pressure relief and purge systems.** Pressure relief devices, fusible plugs and purge systems discharging to the atmosphere from refrigeration systems containing flammable, toxic or highly toxic refrigerants or ammonia shall comply with Sections 608.13.2 through 608.13.4.

**608.13.1 Fusible plugs and rupture members.** Discharge piping and devices connected to the discharge side of a fusible plug or rupture member shall have provisions to prevent plugging the pipe in the event the fusible plug or rupture member functions.

**608.13.2 Flammable refrigerants.** Systems containing more than 6.6 pounds (3 kg) of flammable refrigerants having a density equal to or greater than the density of air shall discharge vapor to the atmosphere only through an *approved* treatment system in accordance with Section 608.13.5 or a flaring system in accordance with Section 608.13.6. Systems containing more than 6.6 pounds (3 kg) of flammable refrigerants having a density less than the density of air shall be permitted to discharge vapor to the atmosphere provided that the point of discharge is located outside of the structure at not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or *exit*.

**608.13.3 Toxic and highly toxic refrigerants.** Systems containing more than 6.6 pounds (3 kg) of toxic or highly toxic refrigerants shall discharge vapor to the atmosphere only through an *approved* treatment system in accordance with Section 608.13.5 or a flaring system in accordance with Section 608.13.6.

**[S] 608.13.4 Ammonia refrigerant.** Systems containing more than 6.6 pounds (3 kg) of ammonia refrigerant shall discharge vapor to the atmosphere in accordance with one of the following methods:

1. Directly to atmosphere where the *fire code official* determines, on review of an analysis prepared in accordance with Section 104.8.2, that a health hazard would not result from atmospheric discharge of ammonia.
2. Through an *approved* treatment system in accordance with Section 608.13.5.
3. Through a flaring system in accordance with Section 608.13.6.
4. Through an *approved* ammonia diffusion system in accordance with Section 608.13.7.
5. By other *approved* means.

**Exception:** Ammonia/water absorption systems containing less than 22 pounds (10 kg) of ammonia and for which the ammonia circuit is located entirely outdoors.

**608.13.5 Treatment systems.** Treatment systems shall be designed to reduce the allowable discharge concentration of the refrigerant gas to not more than 50 percent of the IDLH at the point of exhaust. Treatment systems shall be in accordance with Chapter 60.

## BUILDING SERVICES AND SYSTEMS

[M] **608.18.3 Emergency ventilation system discharge.** The point of discharge to the atmosphere shall be located outside of the structure at not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or *exit*.

[S] **608.19 Standby power.** Where mechanical ventilation, treatment systems, temperature control, alarm, detection, or other electrically operated systems are required, such systems shall be provided with legally required standby power.

**Exception:** Legally required standby power is not required where an *approved* fail-safe engineered system is installed.

### SECTION 609 HYPERBARIC FACILITIES

**609.1 General.** Hyperbaric facilities shall be inspected, tested and maintained in accordance with NFPA 99.

**609.2 Records.** Records shall be maintained of all testing and repair conducted on the hyperbaric chamber and associated devices and equipment. Records shall be available to the *fire code official*.

### SECTION 610 CLOTHES DRYER EXHAUST SYSTEMS

**610.1 Clothes dryer exhaust duct systems.** Clothes dryer exhaust duct systems shall be in accordance with Sections 610.1.1 and 610.1.2.

**610.1.1 Installation.** Clothes dryer exhaust duct systems shall be installed in accordance with the *International Mechanical Code* or the *International Fuel Gas Code*, and the manufacturer's installation instructions.

**610.1.2 Maintenance.** The lint trap, mechanical and heating components, and the exhaust duct system of a clothes dryer shall be maintained in accordance with the manufacturer's operating instructions to prevent the accumulation of lint or debris that prevents the exhaust of air and products of combustion.

## CHAPTER 7

# FIRE AND SMOKE PROTECTION FEATURES

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**User note:**

**About this chapter:** Chapter 7 provides requirements to maintain the fire-resistance ratings of building elements and to limit fire spread. Section 701 addresses the maintenance of and owner's responsibility for construction elements such as fire barriers and smoke barriers. The rest of the chapter deals with various aspects that also must be maintained to achieve overall fire resistance of the main fire- and smoke-resistive features. These include penetrations, joint protection, door and window openings, and duct and air transfer opening protection.

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### SECTION 701 GENERAL

**701.1 Scope.** The provisions of this chapter shall govern the inspection and maintenance of the materials, systems and assemblies used for structural *fire resistance*, *fire-resistance-rated* construction separation of adjacent spaces and construction installed to resist the passage of smoke to safeguard against the spread of fire and smoke within a building and the spread of fire to or from buildings. New buildings shall comply with the *International Building Code*.

**701.2 Fire-resistance-rated construction.** The *fire-resistance rating* of the following *fire-resistance-rated* construction shall be maintained:

1. Structural members.
2. *Exterior walls*.
3. *Fire walls, fire barriers, fire partitions*.
4. *Horizontal assemblies*.
5. Shaft enclosures.

**701.2.1 Hanging displays.** The hanging and displaying of salable goods and other decorative materials from acoustical ceiling systems that are part of a *fire-resistance-rated horizontal assembly* shall be prohibited.

**701.3 Smoke barriers.** The *fire-resistance rating* and smoke-resistant characteristics of *smoke barriers* shall be maintained.

**701.4 Smoke partitions.** The smoke-resistant characteristics of smoke partitions shall be maintained.

**701.5 Maintaining protection.** Materials, systems and devices used to repair or protect breaches and openings in *fire-resistance-rated* construction and construction installed to resist the passage of smoke shall be maintained in accordance with Sections 703 through 707.

**[S] 701.6 Owner's responsibility.** The *owner* shall maintain an inventory of all required *fire-resistance-rated* construction, construction installed to resist the passage of smoke and the construction included in Sections 703 through 707 and Sections 602.4.1 and 602.4.2 of the *International Building Code*, when required by the fire code official. Such construction shall be visually inspected by the *owner* annually and properly repaired, restored or replaced where damaged, altered, breached or penetrated. Records of inspections and repairs shall be maintained. Where concealed, such elements shall not be required to be visually inspected by the *owner* unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space.

**Exception:** When requested by the building owner and approved by the fire code official, the visual inspection required by Section 701.6 may be modified to a time period greater than annually based on the past performance of the owner.

**701.7 Unsafe conditions.** Where any components in this chapter are not maintained and do not function as intended or do not have the *fire resistance* or the resistance to the passage of smoke required by the code under which the building was constructed, remodeled or altered, such component(s) or portion thereof shall be deemed an unsafe condition, in accordance with Section 114.1.1. Components or portions thereof determined to be unsafe shall be repaired or replaced to conform to that code under which the building was constructed, remodeled or altered or this chapter, as deemed appropriate by the *fire code official*.

Where the condition of components is such that any building, structure or portion thereof presents an imminent danger to the occupants of the building, structure or portion thereof, the *fire code official* shall act in accordance with Section 114.2.

with NFPA 80 and NFPA 105. Openings in smoke partitions shall be inspected and maintained in accordance with NFPA 105. Fire doors and smoke and draft control doors shall not be blocked, obstructed, or otherwise made inoperable. Fusible links shall be replaced promptly whenever fused or damaged. *Opening protectives* and smoke and draft control doors shall not be modified.

**705.2.1 Labeling requirements.** Where *approved* by the *fire code official*, the application of field-applied labels associated with the maintenance of *opening protectives* shall follow the requirements of the *approved* third-party certification organization accredited for *listing* the opening protective.

**705.2.2 Signs.** Where required by the *fire code official*, a sign shall be permanently displayed on or near each *fire door* in letters not less than 1 inch (25 mm) high to read as follows:

1. For doors designed to be kept normally open: "FIRE DOOR—DO NOT BLOCK."
2. For doors designed to be kept normally closed: "FIRE DOOR—KEEP CLOSED."

**705.2.3 Hold-open devices and closers.** Hold-open devices and automatic door closers, where provided, shall be maintained. During the period that such device is out of service for repairs, the door it operates shall remain in the closed position.

**705.2.4 Door operation.** Swinging *fire doors* shall close from the full-open position and latch automatically.

**705.2.5 Smoke- and heat-activated doors.** Smoke-activated doors shall be maintained to self-close or automatically close upon detection of smoke. Existing fusible-link-type automatic door-closing devices are permitted if the fusible link rating does not exceed 135°F (57°C).

**705.2.6 Testing.** Horizontal and vertical sliding and rolling *fire doors* shall be inspected and tested annually to confirm proper operation and full closure. Records of inspections and testing shall be maintained.

## SECTION 706 DUCT AND AIR TRANSFER OPENINGS

[S] **706.1 Maintaining protection.** Dampers protecting ducts and air transfer openings shall be inspected and maintained in accordance with NFPA 80 and NFPA 105. Other products or materials used to protect the openings for ducts and air transfer openings shall be securely attached to or bonded to the construction containing the duct or air transfer opening, without visible openings through or into the cavity of the construction. Any damaged products or materials protecting duct and air transfer openings shall be repaired, restored or replaced.

**706.1.1 Testing frequency.** Dampers shall be inspected and tested one year after installation and then every four years thereafter. In Group I-2 Occupancies, dampers shall be inspected and tested one year after installation and then every six years thereafter.

**706.1.2 Records.** Reports of inspections and testing shall be made available to the *fire code official* upon request.

**706.1.3 Qualifications.** Individuals performing inspections, testing and maintenance shall have certification from an *approved organization* or *approved school*, or an *approved certificate* issued by the manufacture of the damper equipment which demonstrates adequate skills and experience.

**706.2 Unprotected openings.** Unprotected duct and air transfer openings in *fire-resistance-rated* construction and construction installed to resist the passage of smoke shall be protected so as to comply with requirements that were in effect when the building was constructed.

## SECTION 707 CONCEALED SPACES

**707.1 Fireblocking and draftstopping.** Required *fireblocking* and draftstopping in combustible concealed spaces shall be maintained to provide continuity and integrity of the construction.

## SECTION 708 SPRAY FIRE-RESISTANT MATERIALS AND INTUMESCENT FIRE-RESISTANT MATERIALS

**708.1 Maintaining protection.** Where required when the building was originally permitted and constructed, spray fire-resistant materials and intumescent fire-resistant materials shall be visually inspected to verify that the materials do not exhibit exposure to the substrate.

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- The total heat released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.

**Exception:** Mattresses in rooms or spaces protected by an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1.

**805.4.2.3 Identification.** Mattresses shall bear the label of an *approved* agency, confirming compliance with the requirements of Sections 805.4.2.1 and 805.4.2.2.

**SECTION 806  
NATURAL DECORATIVE VEGETATION IN NEW AND EXISTING BUILDINGS**

**806.1 Natural cut trees.** Natural cut trees, where allowed by this section, shall have the trunk bottoms cut off not less than 0.5 inch (12.7 mm) above the original cut and shall be placed in a support device complying with Section 806.1.2.

**[W] 806.1.1 Restricted occupancies.** Natural cut trees shall be prohibited (~~((within ambulatory care facilities and Group A, E, I-1, I-2, I-3, I-4, M, R-1, R-2 and R-4 occupancies.))~~) in the following occupancies:

- Group I; and
- R-2 occupancies providing licensed care to clients in one of the categories listed in the International Building Code, Section 310.1, licensed by Washington State.

~~((Exceptions:~~

- ~~Trees located in areas protected by an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2 shall not be prohibited in Groups A, E, M, R-1 and R-2.~~
- ~~Trees shall be allowed within *dwelling units* in Group R-2 occupancies.)~~

**[W] 806.1.2 Support devices.** The support device that holds the tree in an upright position shall be of a type that is stable and that meets all of the following criteria:

- The device shall hold the tree securely and be of adequate size to avoid tipping over of the tree.
- The device shall be capable of containing a minimum (~~two-day~~) supply of water in accordance with Table 806.1.2.
- The water level, when full, shall cover the tree stem not less than 2 inches (51 mm). The water level shall be maintained above the fresh cut and checked not less than once daily.

**[W] TABLE 806.1.2  
SUPPORT STAND WATER CAPACITY**

<u>TREE STEM DIAMETER (inches)</u>	<u>MINIMUM SUPPORT STAND WATER CAPACITY (gallons)</u>	<u>TYPICAL DAILY WATER EVAPORATION AMOUNT (gallons)</u>
<u>Up to 4</u>	<u>1</u>	<u>1/4 to 1</u>
<u>4 to 6</u>	<u>1-1/2</u>	<u>1-1/4 to 1-1/2</u>
<u>7 to 8</u>	<u>2</u>	<u>1-3/4 to 2</u>
<u>9 to 12</u>	<u>3</u>	<u>2-1/4 to 3</u>
<u>13 and over</u>	<u>4</u>	<u>Over 3</u>

**806.1.3 Dryness.** The tree shall be removed from the building whenever the needles or leaves fall off readily when a tree branch is shaken or if the needles are brittle and break when bent between the thumb and index finger. The tree shall be checked daily for dryness.

**806.1.4 Fire-retardant treatments for natural cut trees.** Where fire-retardant treatments are applied to natural cut trees, the fire-retardant treatment shall be tested by an *approved* agency and shall comply with both Test Method 1 and Test Method 2 of ASTM E3082.

**806.2 Obstruction of means of egress.** The required width of any portion of a *means of egress* shall not be obstructed by decorative vegetation. Natural cut trees shall not be located within an *exit, corridor, or a lobby or vestibule.*

**806.3 Open flame.** Candles and open flames shall not be used on or near decorative vegetation. Natural cut trees shall be kept a distance from heat vents and any open flame or heat-producing devices not less than the height of the tree.

**806.4 Electrical fixtures and wiring.** The use of unlisted electrical wiring and lighting on natural vegetation, including natural cut trees, shall be prohibited.

**SECTION 807**  
**DECORATIVE MATERIALS AND ARTIFICIAL DECORATIVE VEGETATION**  
**IN NEW AND EXISTING BUILDINGS**

**807.1 General.** The following requirements shall apply to all occupancies:

1. Furnishings or decorative materials of an explosive or highly flammable character shall not be used.
2. Fire-retardant coatings in existing buildings shall be maintained so as to retain the effectiveness of the treatment under service conditions encountered in actual use.
3. Furnishings or other objects shall not be placed to obstruct *exits*, access thereto, egress therefrom or visibility thereof.
4. The permissible amount of noncombustible decorative materials shall not be limited.

**807.2 Combustible decorative materials.** In Groups A, B, E, I, M and R-1 and in dormitories in Group R-2, curtains, draperies, fabric hangings and other similar combustible decorative materials suspended from walls or ceilings shall comply with Section 807.3 and shall not exceed 10 percent of the specific wall or ceiling area to which such materials are attached.

Fixed or movable walls and partitions, paneling, wall pads and crash pads applied structurally or for decoration, acoustical correction, surface insulation or other purposes shall be considered to be *interior finish*, shall comply with Section 803 and shall not be considered *decorative materials* or furnishings.

**Exceptions:**

1. In auditoriums in Group A, the permissible amount of curtains, draperies, fabric hangings and similar combustible decorative material suspended from walls or ceilings shall not exceed 75 percent of the aggregate wall area where the building is equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, and where the material is installed in accordance with Section 803.15 of the *International Building Code*.
2. In Group R-2 dormitories, within *sleeping units* and *dwelling units*, the permissible amount of curtains, draperies, fabric hangings and similar decorative materials suspended from walls or ceilings shall not exceed 50 percent of the aggregate wall areas where the building is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.
3. In Group B and M occupancies, the amount of combustible fabric partitions suspended from the ceiling and not supported by the floor shall comply with Section 807.3 and shall not be limited.
4. The 10-percent limit shall not apply to curtains, draperies, fabric hangings and similar combustible decorative materials used as window coverings.

**[S] 807.3 Acceptance criteria and reports.** Where required to exhibit improved fire performance, curtains, draperies, fabric hangings and other similar combustible decorative materials suspended from walls or ceilings shall be tested by an *approved* agency and meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 or other approved standard, or exhibit a maximum rate of heat release of 100 kW when tested in accordance with NFPA 289, using the 20 kW ignition source. Reports of test results shall be prepared in accordance with the test method used and furnished to the *fire code official* upon request.

**807.3 Point of Information**

Acceptable flame certificates for decorative materials include:

1. Certificates indicating compliance with NFPA 701.
2. Certificates verifying approval through the California State Fire Marshal.
3. Certificates indicating compliance with CPAI-84 (*Canvas Products Association International*).

**807.4 Artificial decorative vegetation.** Artificial decorative vegetation shall comply with this section and the requirements of Sections 806.2 and 806.3. Natural decorative vegetation shall comply with Section 806.

**Exception:** Testing of artificial vegetation is not required in Group I-1; Group I-2, Condition 1; Group R-2; Group R-3; or Group R-4 occupancies equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1, where such artificial vegetation complies with the following:

1. Wreaths and other decorative items on doors shall not obstruct the door operation and shall not exceed 50 percent of the surface area of the door.
2. Decorative artificial vegetation shall be limited to not more than 30 percent of the wall area to which it is attached.
3. Decorative artificial vegetation not on doors or walls shall not exceed 3 feet (914 mm) in any dimension.

**807.4.1 Flammability.** Artificial decorative vegetation shall meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701. Meeting such criteria shall be documented and certified by the manufacturer in an *approved* manner. Alternatively, the artificial decorative vegetation shall be tested in accordance with NFPA 289, using the 20 kW ignition source, and shall have a maximum heat release rate of 100 kW.



## CHAPTER 9

# FIRE PROTECTION AND LIFE SAFETY SYSTEMS

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### User note:

**About this chapter:** Chapter 9 prescribes the minimum requirements for active fire protection equipment systems to perform the functions of detecting a fire, alerting the occupants or fire department of a fire emergency, mass notification, gas detection, controlling smoke and controlling or extinguishing the fire. Generally, the requirements are based on the occupancy, the height and the area of the building because these are the factors that most affect fire-fighting capabilities and the relative hazard of a specific building or portion thereof. This chapter parallels and is substantially duplicated in Chapter 9 of the International Building Code®; however, this chapter also contains periodic testing criteria that are not contained in the International Building Code. In addition, the special fire protection system requirements based on use and occupancy found in Chapter 4 of the International Building Code are duplicated in this chapter as a user convenience.

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### SECTION 901 GENERAL

**901.1 Scope.** The provisions of this chapter shall specify where *fire protection* and *life safety systems* are required and shall apply to the design, installation, inspection, operation, testing and maintenance of all *fire protection* and *life safety systems*.

**901.2 Construction documents.** The *fire code official* shall have the authority to require *construction documents* and calculations for all *fire protection* and *life safety systems* and to require permits be issued for the installation, rehabilitation or modification of any *fire protection* and *life safety systems*. *Construction documents* for *fire protection* and *life safety systems* shall be submitted for review and approval prior to system installation.

**[S] 901.2.1 Statement of compliance.** Before requesting final or partial approval of the installation, where required by the *fire code official*, the installing contractor shall furnish a written statement to the *fire code official* that the subject *fire protection* or *life safety system* has been installed in accordance with *approved* plans and has been tested in accordance with the manufacturer's specifications and the appropriate installation standard. Any deviations from the design standards shall be noted and copies of the approvals for such deviations shall be attached to the written statement.

**901.3 Permits.** Permits shall be required as set forth in Sections 105.5 and 105.6.

**[S] 901.4 Fire protection and life safety systems.** *Fire protection* and *life safety systems* shall be installed, repaired, operated and maintained in accordance with this code, all Administrative Rules adopted by the *fire code official* per Section 104.1, and the (~~*International Building Code*~~) *Seattle Building Code*.

**901.4.1 Required fire protection and life safety systems.** *Fire protection* and *life safety systems* required by this code or the *International Building Code* shall be installed, repaired, operated, tested and maintained in accordance with this code. A *fire protection* or *life safety system* for which a design option, exception or reduction to the provisions of this code or the *International Building Code* has been granted shall be considered to be a required system.

**[W] 901.4.2 Nonrequired fire protection and life safety systems.** (~~*Fire*~~) A *fire protection* and *life safety* (~~*systems*~~) *system* or portions thereof not required by this code or the *International Building Code* shall be allowed to be furnished for partial or complete protection provided that such installed systems meet the applicable requirements of this code and the *International Building Code*. Such *systems* or *portion of system* shall be provided with signage stating "NON-REQUIRED SYSTEM." Signage shall be durable and permanent in nature, with contrasting color and background, and with lettering of not less than 1 inch (25 mm) in height. Location of such signage shall be *approved*.

**901.4.3 Alterations in buildings and structures.** For any *alteration* within a building or structure, the *fire protection* and *life safety systems* shall be extended, altered or augmented to maintain and continue protection within the building or structure. Persons shall not remove or modify any *fire protection* or *life safety system* installed or maintained under the provisions of this code or the (~~*International Building Code*~~) *Seattle Building Code* without approval from the *fire code official*.

**901.4.4 Fire areas.** Where buildings, or portions thereof, are divided into *fire areas* so as not to exceed the limits established for requiring a *fire protection system* in accordance with this chapter, such *fire areas* shall be separated by *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both, having a *fire-resistance rating* of not less than that determined in accordance with Section 707.3.10 of the *International Building Code*.

**901.4.5 Additional fire protection systems.** In occupancies of a hazardous nature, where special hazards exist in addition to the normal hazards of the occupancy, or where the *fire code official* determines that access for fire apparatus is unduly difficult, the *fire code official* shall have the authority to require additional safeguards and *fire protection systems*. *Fire*

## FIRE PROTECTION AND LIFE SAFETY SYSTEMS

*protection and life safety systems* required under this section shall be installed in accordance with this code and the applicable referenced standards.

**901.4.6 Appearance of equipment.** Any device that has the physical appearance of life safety or fire protection equipment but that does not perform that life safety or fire protection function shall be prohibited.

**901.4.7 Pump and riser room size.** Where provided, fire pump rooms and *automatic sprinkler system* riser rooms shall be designed with adequate space for all equipment necessary for the installation, as defined by the manufacturer, with sufficient working space around the stationary equipment. Clearances around equipment to elements of permanent construction, including other installed equipment and appliances, shall be sufficient to allow inspection, service, repair or replacement without removing such elements of permanent construction or disabling the function of a required *fire-resistance-rated* assembly. Fire pump and *automatic sprinkler system* riser rooms shall be provided with doors and unobstructed passageways large enough to allow removal of the largest piece of equipment.

**901.4.7.1 Access.** Automatic sprinkler system risers, fire pumps and controllers shall be provided with *ready access*. Where located in a fire pump room or automatic sprinkler system riser room, the door shall be permitted to be locked provided that the key is available at all times.

**[S] 901.4.7.1.1 Access to other spaces.** No other rooms or spaces not related to the operation of the fire pump and its equipment shall be accessed through or by way of the fire pump room.

**Exception:** Equipment related to domestic water distribution are permitted to have access hatches to equipment or components for maintenance needs.

**[S] 901.4.7.2 Marking on access doors.** Access doors for automatic sprinkler system riser rooms and fire pump rooms shall be labeled with an *approved* sign stating “FIRE SPRINKLER RISER ROOM” or “FIRE PUMP AND RISER ROOM”. The lettering shall be in contrasting color to the background. Letters shall have a minimum height of 2 inches (51 mm) with a minimum stroke of 3/8 inch (10 mm).

**901.4.7.3 Environment.** Automatic sprinkler system riser rooms and fire pump rooms shall be maintained at a temperature of not less than 40°F (4°C). Heating units shall be permanently installed.

**901.4.7.4 Lighting.** Permanently installed artificial illumination shall be provided in the automatic sprinkler system riser rooms and fire pump rooms.

**[S] 901.4.8 Certification.** Individuals who install, inspect, test or maintain fire protection systems shall obtain the proper certificate from the fire code official in accordance with Administrative Rule 9.01.20, *Certificates of Competency for Installing, Inspecting, Testing and Maintaining Fire Protection Systems*, and any future revisions of this rule adopted by the fire code official.

**[S] 901.4.9 Control valve access for water-based systems.** All control valves shall be installed in accessible locations and be visible from the floor without removing or moving ceiling panels or other visible obstructions. Accessible locations shall not require access through hatches or the use of portable ladders. If the control valve can be operated and maintained from the occupied side, valves can be located behind small hatches or panels with identifying signage that has lettering, with a contrasting background, and with a minimum height of 1 inch (25 mm). Valves located more than 7 feet (2134 mm) above a floor shall be provided with a permanent means of accessing, such as a ladder, or operating the valve with chain-operated hand wheels. Control valves shall be located within the individual dwelling unit, townhouse unit or attached garage that the control valve serves for Group R-3, one-and two- family dwelling units or townhouses.

**901.5 Installation acceptance testing.** *Fire protection and life safety systems* and appurtenances thereto shall be subject to acceptance tests as contained in the installation standards and as *approved* by the *fire code official*. The *fire code official* shall be notified before any required acceptance testing.

**[S] 901.5.1 Occupancy.** It shall be unlawful to occupy any portion of a building or structure until the systems or portion thereof required ((*fire protection and life safety systems*)) by this code or the Seattle Building Code have been tested and approved.

**Exception:** Buildings that have approval for a Temporary Certificate of Occupancy per SFD Administrative Rule 9.07.17, *Partial/Phased Occupancy, Occupancy During Construction and Temporary Certificates of Occupancy*, and any future revisions of the rule adopted by the fire code official.

**901.6 Inspection, testing and maintenance.** *Fire protection and life safety systems* shall be maintained in an operative condition at all times, and shall be replaced or repaired where defective. Nonrequired *fire protection and life safety systems* and equipment shall be inspected, tested and maintained or removed in accordance with Section 901.8.

**[S] 901.6.1 Standards.** *Fire protection systems* shall be inspected, tested and maintained in accordance with Administrative Rule 9.02.24, *Inspection, Testing, Maintenance and Reporting Requirements for Fire Protection and Life Safety Systems, Private Fire Hydrants and Emergency Responder Communication Enhancement Systems*, and any future revisions of this rule adopted by the fire code official and also in accordance with the referenced standards listed in Table 901.6.1.

[S] TABLE 901.6.1  
FIRE PROTECTION SYSTEM MAINTENANCE STANDARDS

SYSTEM	STANDARD
Portable fire extinguishers	NFPA 10
Carbon dioxide fire-extinguishing systems	NFPA 12
Halon 1301 fire-extinguishing systems	NFPA 12A
Dry-chemical extinguishing systems	NFPA 17
Wet-chemical extinguishing systems	NFPA 17A
Water-based fire protection systems	NFPA 25
Fire alarm systems	NFPA 72
<u>Smoke control systems</u>	<u>NFPA 92,</u> <u>NFPA 4</u>
Smoke and heat vents	NFPA 204
Water-mist systems	NFPA 750
Clean-agent extinguishing systems	NFPA 2001
Aerosol fire-extinguishing systems	NFPA 2010

**901.6.2 Integrated testing.** Where two or more *fire protection* or *life safety systems* are interconnected, the intended response of subordinate *fire protection* and *life safety systems* shall be verified when required testing of the initiating system is conducted. In addition, integrated testing shall be performed in accordance with Sections 901.6.2.1 and 901.6.2.2.

**901.6.2.1 High-rise buildings.** For high-rise buildings, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 10 years, unless otherwise specified by an integrated system test plan prepared in accordance with NFPA 4. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.

**901.6.2.2 Smoke control systems.** Where a fire alarm system is integrated with a smoke control system as outlined in Section 909, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 10 years, unless otherwise specified by an integrated system test plan prepared in accordance with NFPA 4. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.

[S] **901.6.3 Records.** Records of all system inspections, tests and maintenance required by the referenced standards shall be maintained with copies available to the fire code official upon request.

**901.6.3.1 Records information.** Initial records shall include the name of the installation contractor, type of components installed, manufacturer of the components, location and number of components installed per floor. Records shall include the manufacturers' operation and maintenance instruction manuals. Such records shall be maintained for the life of the installation.

[S] **901.7 Systems impaired or out of service.** Where a ((~~required~~)) *fire protection system* is impaired or out of service, ((~~the fire department and the fire code official shall be notified immediately and, where required by the fire code official, the building shall be either evacuated or an approved fire watch shall be provided for all occupants left unprotected by the shutdown until the fire protection system has been returned to service~~)) the procedures detailed in Administrative Rule 9.04.21, *Impaired Fire Protection Systems and Emergency Responder Radio Amplification Systems*, and any future revisions of this rule adopted by the fire code official shall be implemented.

((Where utilized, fire watches shall be provided with not less than one *approved* means for notification of the fire department and their only duty shall be to perform constant patrols of the protected premises and keep watch for fires.))

((**Exception:** Facilities with an *approved* notification and impairment management program. The notification and impairment program for water-based *fire protection systems* shall comply with NFPA 25.))

**901.7.1 Impairment coordinator.** The building *owner* shall assign an impairment coordinator to comply with the requirements of this section. In the absence of a specific designee, the *owner* shall be considered to be the impairment coordinator.

**901.7.2 Tag required.** A tag shall be used to indicate that a system, or portion thereof, has been removed from service.

**901.7.3 Placement of tag.** The tag shall be posted at each fire department connection, system control valve, fire alarm control unit, fire alarm annunciator and *fire command center*, indicating which system, or part thereof, has been removed from service. The *fire code official* shall specify where the tag is to be placed.

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**901.7.4 Preplanned impairment programs.** Preplanned impairments shall be authorized by the impairment coordinator. Before authorization is given, a designated individual shall be responsible for verifying that all of the following procedures have been implemented:

1. The extent and expected duration of the impairment have been determined.
2. The areas or buildings involved have been inspected and the increased risks determined.
3. Recommendations have been submitted to management or the building *owner/manager*.
4. The fire department has been notified.
5. The insurance carrier, the alarm company, the building *owner/manager* and other authorities having jurisdiction have been notified.
6. The supervisors in the areas to be affected have been notified.
7. A tag impairment system has been implemented.
8. Necessary tools and materials have been assembled on the impairment site.

**901.7.5 Emergency impairments.** Where unplanned impairments occur, appropriate emergency action shall be taken to minimize potential injury and damage. The impairment coordinator shall implement the steps outlined in Section 901.7.4.

**901.7.6 Restoring systems to service.** Where impaired equipment is restored to normal working order, the impairment coordinator shall verify that all of the following procedures have been implemented:

1. Necessary inspections and tests have been conducted to verify that affected systems are operational.
2. Supervisors have been advised that protection is restored.
3. The fire department has been advised that protection is restored.
4. The building *owner/manager*, insurance carrier, alarm company and other involved parties have been advised that protection is restored.
5. The impairment tag has been removed.

**[S] 901.8 Removal of or tampering with equipment.** It shall be unlawful for any person to remove, tamper with or otherwise disturb any *fire protection or life safety system* required by this code and nonrequired *fire protection and life safety system* except for the purposes of extinguishing fire, training, recharging or making necessary repairs or where *approved by the fire code official*.

**901.8.1 Removal of or tampering with appurtenances.** Locks, gates, doors, barricades, chains, enclosures, signs, tags or seals that have been installed by or at the direction of the *fire code official* shall not be removed, unlocked, destroyed, tampered with or otherwise vandalized in any manner.

**[W][S] 901.8.2 Removal of existing occupant-use hose lines.** The *fire code official* is authorized to permit the removal of existing occupant-use hose lines where ~~((both))~~ all of the following conditions exist:

1. Installation is not required by this code, the International Building Code, or a previously *approved* alternative method.
2. The floor with the hose lines is equipped throughout with an automatic sprinkler system.
- ~~((4))~~ 3. The hose line would not be utilized by trained personnel or the fire department.
- ~~((2))~~ 4. The ~~((remaining))~~ building is provided with a class I standpipe system having outlets ~~((are))~~ compatible with local fire department fittings.

**901.9 Termination of monitoring service.** For fire alarm systems required to be monitored by this code, notice shall be made to the *fire code official* whenever alarm monitoring services are terminated. Notice shall be made in writing by the provider of the monitoring service being terminated.

### **901.9. Point of Information**

Termination of monitoring service only applies when monitoring contracts have expired or are cancelled.

**901.10 Recall of fire protection components.** Any *fire protection system* component regulated by this code that is the subject of a voluntary or mandatory recall under federal law shall be replaced with *approved, listed* components in compliance with the referenced standards of this code. The *fire code official* shall be notified in writing by the building *owner* when the recalled component parts have been replaced.

**[S] 901.11 Cabinets.** Cabinets containing fire-fighting equipment, such as standpipes, fire hose, fire extinguishers or fire department valves, shall not be blocked from use or obscured from view.

**[S] 901.11.1 Cabinet equipment identification.** Cabinets shall be identified in an *approved* manner by a permanently attached sign with letters not less than 2 inches (51 mm) high in a color that contrasts with the background color, indicating the equipment contained therein.

**Exceptions:**

1. Doors not large enough to accommodate a written sign shall be marked with a permanently attached pictogram of the equipment contained therein.
2. Doors that have either an *approved* visual identification clear glass panel or a complete glass door panel.

**[S] 901.11.2 Locking cabinet doors.** Cabinets shall be unlocked.

**Exceptions:**

1. Visual identification panels of glass or other *approved* transparent frangible material that is easily broken and allows access.
2. *Approved* locking arrangements.
3. Group I-3 occupancies.

**[S] 901.12 Preventable fire alarms.** It shall be unlawful for any *person* or *owner* to give, signal, or transmit or for any *person* or *owner* to cause or permit to be given, signaled, or transmitted in any manner any *preventable fire alarm*. An *owner* shall be responsible for any *preventable fire alarm* occurring on the *owner's* property caused by a tenant, occupant, or guest. An *owner* shall also be responsible for any *preventable fire alarm* occurring on the *owner's* property that is caused by mechanical failure or is the result of improper testing or maintenance of a fire alarm system.

## SECTION 902 DEFINITIONS

**[S] 902.1 Definitions.** The following terms are defined in Chapter 2:

ALARM NOTIFICATION APPLIANCE.

ALARM SIGNAL.

ALARM VERIFICATION FEATURE.

ANNUNCIATOR.

AUDIBLE ALARM NOTIFICATION APPLIANCE.

AUTOMATIC.

AUTOMATIC FIRE-EXTINGUISHING SYSTEM.

AUTOMATIC SMOKE DETECTION SYSTEM.

AUTOMATIC SPRINKLER SYSTEM.

AUTOMATIC WATER MIST SYSTEM.

AVERAGE AMBIENT SOUND LEVEL.

CARBON DIOXIDE EXTINGUISHING SYSTEM.

CLEAN AGENT.

COMMERCIAL MOTOR VEHICLE.

CONSTANTLY ATTENDED LOCATION.

DELUGE SYSTEM.

DETECTOR, HEAT.

DRY-CHEMICAL EXTINGUISHING AGENT.

ELEVATOR GROUP.

EMERGENCY ALARM SYSTEM.

EMERGENCY VOICE/ALARM  
COMMUNICATIONS.

FIRE ALARM BOX, MANUAL.

FIRE ALARM CONTROL UNIT.

FIRE ALARM SIGNAL.

FIRE ALARM SYSTEM.

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**FIRE AREA.**

**FIRE DETECTION SYSTEM.**

**FIRE DETECTOR, AUTOMATIC.**

**FIRE PROTECTION SYSTEM.**

**FIRE SAFETY FUNCTIONS.**

**FIXED BASE OPERATOR (FBO).**

**FOAM-EXTINGUISHING SYSTEM.**

**GAS DETECTION SYSTEM.**

**HALOGENATED EXTINGUISHING SYSTEM.**

**IMPAIRMENT COORDINATOR.**

**INITIATING DEVICE.**

**LIFE SAFETY SYSTEMS.**

**MANUAL FIRE ALARM BOX.**

**MULTIPLE-STATION ALARM DEVICE.**

**MULTIPLE-STATION SMOKE ALARM.**

**NOTIFICATION ZONE.**

**NUISANCE ALARM.**

**[W] PORTABLE SCHOOL CLASSROOM.**

**PREVENTABLE FIRE ALARM.**

**PRIVATE GARAGE.**

**RECORD DRAWINGS.**

**REPAIR GARAGE.**

**Major Repair Garage.**

**Minor Repair Garage.**

**SINGLE-STATION SMOKE ALARM.**

**SLEEPING UNIT.**

**SMOKE ALARM.**

**SMOKE DETECTOR.**

**STANDPIPE, TYPES OF.**

**Automatic dry.**

**Automatic wet.**

**Manual dry.**

**Manual wet.**

**Semiautomatic dry.**

**STANDPIPE SYSTEM, CLASSES OF.**

**Class I system.**

**Class II system.**

**Class III system.**

**SUPERVISING STATION.**

**SUPERVISORY SERVICE.**

**SUPERVISORY SIGNAL.**

**SUPERVISORY SIGNAL-INITIATING DEVICE.**

**TIRES, BULK STORAGE OF.**

**TRANSIENT AIRCRAFT.**

**TROUBLE SIGNAL.**

VISIBLE ALARM NOTIFICATION APPLIANCE.

WET-CHEMICAL EXTINGUISHING AGENT.

WIRELESS PROTECTION SYSTEM.

ZONE.

ZONE, NOTIFICATION.

### SECTION 903 AUTOMATIC SPRINKLER SYSTEMS

**903.1 General.** *Automatic sprinkler systems* shall comply with this section.

**903.1.1 Alternative protection.** Alternative automatic fire-extinguishing systems complying with Section 904 shall be permitted instead of automatic sprinkler system protection where recognized by the applicable standard and *approved* by the *fire code official*.

**[W][S] 903.2 Where required.** *Approved automatic sprinkler systems* in new buildings and structures shall be provided in the locations described in Sections 903.2.1 through 903.2.12.

**~~(Exception)~~ Exceptions:**

- 1.** ~~(Spaces)~~ Where allowed, spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided that those spaces or areas are equipped throughout with an automatic smoke detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or not less than 2-hour *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both.
- 2.** Bottom of the elevator hoistway in an enclosed and noncombustible elevator shaft per Joint Administrative Ruling 9.06.14 and any future revisions.

**903.2.1 Group A.** An *automatic sprinkler system* shall be provided throughout buildings and portions thereof used as Group A occupancies as provided in this section.

**903.2.1.1 Group A-1.** An *automatic sprinkler system* shall be provided throughout stories containing Group A-1 occupancies and throughout all stories from the Group A-1 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

- 1.** The *fire area* exceeds 12,000 square feet (1115 m<sup>2</sup>).
- 2.** The *fire area* has an *occupant load* of 300 or more.
- 3.** The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.
- 4.** The *fire area* contains a multiple-theater complex.

**[S] 903.2.1.2 Group A-2.** An *automatic sprinkler system* shall be provided throughout stories containing Group A-2 occupancies and throughout all stories from the Group A-2 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

- 1.** The *fire area* exceeds 5,000 square feet (464 m<sup>2</sup>).
- 2.** The *fire area* has an *occupant load* of 100 or more.
- 3.** The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

**Exception:** Subsection 903.2.1.2(3) does not apply to *fire areas* that include space located one floor above the *level of exit discharge* if the *occupant load* of the upper floor is less than 50.

**[W][S] 903.2.1.3 Group A-3.** An *automatic sprinkler system* shall be provided throughout stories containing Group A-3 occupancies and throughout all stories from the Group A-3 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

- 1.** The *fire area* exceeds 12,000 square feet (1115 m<sup>2</sup>).
- 2.** The *fire area* has an *occupant load* of 300 or more.
- 3.** The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

**Exceptions:**

- 1.** Subsection 903.2.1.3(3) does not apply to *fire areas* that include space located one floor above the *level of exit discharge* if the *occupant load* of the upper floor is less than 50.

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2. For fixed guideway transit and passenger rail systems stations, an automatic sprinkler system shall be provided in accordance with Section 4901.

**903.2.1.4 Group A-4.** An *automatic sprinkler system* shall be provided throughout stories containing Group A-4 occupancies and throughout all stories from the Group A-4 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m<sup>2</sup>).
2. The *fire area* has an *occupant load* of 300 or more.
3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

**903.2.1.5 Group A-5.** An *automatic sprinkler system* shall be provided for all enclosed Group A-5 accessory use areas in excess of 1,000 square feet (93 m<sup>2</sup>).

**903.2.1.5.1 Spaces under grandstands or bleachers.** Enclosed spaces under *grandstands* or *bleachers* shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1 where either of the following exist:

1. The enclosed area is 1,000 square feet (93 m<sup>2</sup>) or less and is not constructed in accordance with Section 1030.1.1.1.
2. The enclosed area exceeds 1,000 square feet (93 m<sup>2</sup>).

**[W] 903.2.1.6 Assembly occupancies on roofs.** Where an occupied roof has an assembly occupancy with an *occupant load* exceeding 100 for Group A-2 and 300 for other Group A occupancies, (~~all floors between the occupied roof and the level of exit discharge~~) the building shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

**Exception:** Open parking garages of Type I or Type II construction.

**903.2.1.7 Multiple fire areas.** An *automatic sprinkler system* shall be provided where multiple *fire areas* of Group A-1, A-2, A-3 or A-4 occupancies share *exit* or *exit access* components and the combined *occupant load* of these *fire areas* is 300 or more.

**[W] 903.2.1.8 Nightclub.** An *automatic sprinkler system* shall be provided throughout Group A-2 *nightclubs* as defined in this code.

**903.2.2 Ambulatory care facilities.** An *automatic sprinkler system* shall be installed throughout the entire floor containing an ambulatory care facility where either of the following conditions exist at any time:

1. Four or more care recipients are incapable of self-preservation.
2. One or more care recipients that are incapable of self-preservation are located at other than the *level of exit discharge* serving such a facility.

In buildings where ambulatory care is provided on levels other than the *level of exit discharge*, an *automatic sprinkler system* shall be installed throughout the entire floor as well as all floors below where such care is provided, and all floors between the level of ambulatory care and the nearest *level of exit discharge*, the *level of exit discharge*, and all floors below the *level of exit discharge*.

**Exception:** Floors classified as an open parking garage are not required to be sprinklered.

**[W] 903.2.3 Group E.** An *automatic sprinkler system* shall be provided for *fire areas containing* Group E occupancies (~~as follows:~~) where the fire area has an occupant load of 51 or more, calculated in accordance with Table 1004.5.

~~(1. Throughout all Group E *fire areas* greater than 12,000 square feet (1115 m<sup>2</sup>) in area.~~

~~2. The Group E *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.~~

~~**Exception:** In buildings where every classroom has not fewer than one exterior exit door at ground level, an *automatic sprinkler system* is not required in any area below the lowest *level of exit discharge* serving that area.~~

~~3. The Group E *fire area* has an *occupant load* of 300 or more.)~~

**Exceptions:**

1. Portable school classrooms with an occupant load of 50 or less calculated in accordance with Table 1004.5, provided that the aggregate area of any cluster of portable school classrooms does not exceed 6,000 square feet (557 m<sup>2</sup>); and clusters of portable school classrooms shall be separated as required by the building code; or
2. Portable school classrooms with an occupant load from 51 through 98, calculated in accordance with Table 1004.5, and provided with two means of direct independent exterior egress from each classroom in accordance with Chapter 10, and one exit from each classroom shall be accessible, provided that the aggregate area of any cluster of portable classrooms does not exceed 6,000 square feet (557 m<sup>2</sup>), and clusters of portable school classrooms shall be separated as required by the building code; or



3. Fire areas containing day care and preschool facilities with a total occupant load of 100 or less located at the level of exit discharge where every room in which care is provided has not fewer than one exit discharge door.

**903.2.3. Point of Information**

Raised platforms or egress decks and pathways are not included with the fire area calculation whether the area is provided with weather coverage or not.

**903.2.4 Group F-1.** An *automatic sprinkler system* shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

1. A Group F-1 *fire area* exceeds 12,000 square feet (1115 m<sup>2</sup>).
2. A Group F-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group F-1 *fire areas* on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).

**903.2.4.1 Woodworking operations.** An *automatic sprinkler system* shall be provided throughout all Group F-1 occupancy *fire areas* that contain woodworking operations in excess of 2,500 square feet (232 m<sup>2</sup>) in area that generate finely divided combustible waste or use finely divided combustible materials.

**903.2.4.2 Group F-1 distilled spirits.** An *automatic sprinkler system* shall be provided throughout a Group F-1 *fire area* used for the manufacture of distilled spirits.

**903.2.4.3 Group F-1 upholstered furniture or mattresses.** An *automatic sprinkler system* shall be provided throughout a Group F-1 *fire area* that exceeds 2,500 square feet (232 m<sup>2</sup>) used for the manufacture of upholstered furniture or mattresses.

**903.2.5 Group H.** *Automatic sprinkler systems* shall be provided in high-hazard occupancies as required in Sections 903.2.5.1 through 903.2.5.3.

**903.2.5.1 General.** An *automatic sprinkler system* shall be installed in Group H occupancies.

**903.2.5.2 Group H-5 occupancies.** An *automatic sprinkler system* shall be installed throughout buildings containing Group H-5 occupancies. The design of the sprinkler system shall be not less than that required under the *International Building Code* for the occupancy hazard classifications in accordance with Table 903.2.5.2.

Where the design area of the sprinkler system consists of a *corridor* protected by one row of sprinklers, the maximum number of sprinklers required to be calculated is 13.

**TABLE 903.2.5.2  
GROUP H-5 SPRINKLER DESIGN CRITERIA**

LOCATION	OCCUPANCY HAZARD CLASSIFICATION
Fabrication areas	Ordinary Hazard Group 2
Service corridors	Ordinary Hazard Group 2
Storage rooms without dispensing	Ordinary Hazard Group 2
Storage rooms with dispensing	Extra Hazard Group 2
Corridors	Ordinary Hazard Group 2

**903.2.5.3 Pyroxylin plastics.** An *automatic sprinkler system* shall be provided in buildings, or portions thereof, where cellulose nitrate film or pyroxylin plastics are manufactured, stored or handled in quantities exceeding 100 pounds (45 kg).

**[W][S] 903.2.6 Group I.** An *automatic sprinkler system* in accordance with Section 903.3.1.1 shall be provided throughout buildings with a Group I *fire area* as required in Sections 903.2.6 through 903.2.6.1.1.

**Exceptions:**

1. An *automatic sprinkler system* installed in accordance with Section 903.3.1.2 shall be permitted in Group I-1, Condition 1 facilities, when located in buildings that are within the scope of Section 903.3.1.2.
- ~~((2. An *automatic sprinkler system* is not required where Group I-4 day care facilities are at the level of exit discharge and where every room where care is provided has not fewer than one exterior exit door.~~
3. ~~In buildings where Group I-4 day care is provided on levels other than the level of exit discharge, an *automatic sprinkler system* in accordance with Section 903.3.1.1 shall be installed on the entire floor where care is provided, all floors between the level of care and the level of exit discharge and all floors below the level of exit discharge other than areas classified as an open parking garage.))~~

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2. Where new construction or additions house less than 16 persons receiving care, an automatic sprinkler system installed in accordance with the scope of Section 903.3.1.2 shall be permitted for Group I-1, condition 2, assisted living facilities licensed under chapter 388-78A WAC and residential treatment facilities licensed under chapter 246-337 WAC.
3. An automatic sprinkler system installed in accordance with Section 903.3.1.2 shall be permitted in additions to existing buildings where both of the following situations are true:
  - 3.1. The addition is made to a building previously approved as Group LC or Group R-2 that houses either an assisted living facility licensed under chapter 388-78A WAC or residential treatment facility licensed under chapter 246-337 WAC.
  - 3.2. The addition contains spaces for 16 or fewer persons receiving care.

**[W][S] 903.2.6.1 Group I-4.** An automatic sprinkler system shall be provided in fire areas containing Group I-4 occupancies where the fire area has an occupant load of 51 or more, calculated in accordance with Table 1004.5.

**Exception:** An automatic sprinkler system is not required where Group I-4 day care facilities with a total occupant load of 100 or less, and located at the level of exit discharge and where every room where care is provided has not fewer than one exterior door.

**[S] 903.2.6.1.1 Group I-4 day care located other than level of exit discharge.** In buildings where Group I-4 day care is provided on levels other than the level of exit discharge, an automatic sprinkler system in accordance with Section 903.3.1.1 shall be installed on the entire floor where care is provided, including the level of exit discharge, and all floors between the level of care and the level of exit discharge and all floors below the level of exit discharge other than areas classified as an open parking garage.

**903.2.7 Group M.** An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:

1. A Group M fire area exceeds 12,000 square feet (1115 m<sup>2</sup>).
2. A Group M fire area is located more than three stories above grade plane.
3. The combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).

**903.2.7.1 High-piled storage.** An automatic sprinkler system shall be provided as required in Chapter 32 in all buildings of Group M where storage of merchandise is in high-piled or rack storage arrays.

**903.2.7.2 Group M upholstered furniture or mattresses.** An automatic sprinkler system shall be provided throughout a Group M fire area where the area used for the display and sale of upholstered furniture or mattresses exceeds 5,000 square feet (464 m<sup>2</sup>).

**[W] 903.2.8 Group R.** An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R fire area.

**Exception:** Group R-1 if all of the following conditions apply:

1. The Group R fire area is no more than 500 square feet (47 m<sup>2</sup>) and is used for recreational use only.
2. The Group R fire area is on only one story.
3. The Group R fire area does not include a basement.
4. The Group R fire area is no closer than 30 feet (9144 mm) from another structure.
5. Cooking is not allowed within the Group R fire area.
6. The Group R fire area has an occupant load of no more than 8.
7. A hand-held (portable) fire extinguisher is in every Group R fire area.

**903.2.8.1 Group R-3.** An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in Group R-3 occupancies.

**903.2.8.2 Group R-4, Condition 1.** An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in Group R-4, Condition 1 occupancies.

**903.2.8.3 Group R-4, Condition 2.** An automatic sprinkler system installed in accordance with Section 903.3.1.2 shall be permitted in Group R-4, Condition 2 occupancies.

**903.2.8.4 Care facilities.** An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in care facilities with five or fewer individuals in a single-family dwelling.

**[W] 903.2.8.5 Adult family home.** An adult family home with a capacity of seven or eight that serves residents who require assistance during an evacuation must install an automatic sprinkler system that meets the requirements of NFPA 13D.

[S] **903.2.9 Group S-1.** An *automatic sprinkler system* shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

1. A Group S-1 *fire area* exceeds 12,000 square feet (1115 m<sup>2</sup>).
2. A Group S-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group S-1 *fire areas* on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).
4. A Group S-1 *fire area* used for the storage of commercial motor vehicles where the *fire area* exceeds 5,000 square feet (464 m<sup>2</sup>).
5. A Group S-1 occupancy used for self-storage where the *fire area* exceeds 2,500 square feet (232 m<sup>2</sup>).

[S] **903.2.9.1 ((Repair)) Major repair garages.** An *automatic sprinkler system* shall be provided throughout all buildings used as *major* repair garages in accordance with Section 406.8 of the *International Building Code*, as shown:

1. Buildings having two or more stories above *grade plane*, including *basements*, with a *fire area* containing a *major* repair garage exceeding 10,000 square feet (929 m<sup>2</sup>).
2. Buildings not more than one story above *grade plane*, with a *fire area* containing a *major* repair garage exceeding 12,000 square feet (1115 m<sup>2</sup>).
3. Buildings with *major* repair garages servicing vehicles parked in *basements*.
4. A Group S-1 *fire area* used for the *major* repair of commercial motor vehicles where the *fire area* exceeds 5,000 square feet (464 m<sup>2</sup>).

**903.2.9.2 Bulk storage of tires.** Buildings and structures where the area for the storage of tires exceeds 20,000 cubic feet (566 m<sup>3</sup>) shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

[S] **903.2.9.3 Group S-1 distilled spirits or wine.** An *automatic sprinkler system* shall be provided throughout a Group S-1 *fire area* used for the ((bulk)) storage of distilled spirits or wine.

**903.2.9.4 Group S-1 upholstered furniture and mattresses.** An *automatic sprinkler system* shall be provided throughout a Group S-1 *fire area* where the area used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m<sup>2</sup>).

**Exception:** Self-service storage facilities not greater than one story above grade plane where all storage spaces can be accessed directly from the exterior.

**903.2.10 Group S-2 parking garages.** An *automatic sprinkler system* shall be provided throughout buildings classified as parking garages where any of the following conditions exist:

1. Where the *fire area* of the enclosed parking garage, in accordance with Section 406.6 of the *International Building Code*, exceeds 12,000 square feet (1115 m<sup>2</sup>).
2. Where the enclosed parking garage, in accordance with Section 406.6 of the *International Building Code*, is located beneath other groups.

**Exception:** Enclosed parking garages located beneath Group R-3 occupancies.

3. Where the *fire area* of the open parking garage, in accordance with Section 406.5 of the *International Building Code*, exceeds 48,000 square feet (4460 m<sup>2</sup>).

**903.2.10.1 Commercial parking garages.** An *automatic sprinkler system* shall be provided throughout buildings used for storage of commercial motor vehicles where the *fire area* exceeds 5,000 square feet (464 m<sup>2</sup>).

[S] **903.2.10.2 Mechanical-access enclosed parking garages.** An *approved automatic sprinkler system* shall be provided throughout buildings used for the storage of motor vehicles in a mechanical-access enclosed parking garage. The portion of the building that contains the mechanical-access enclosed parking garage shall be protected with a specially engineered *automatic sprinkler system* designed by a registered design professional. Enclosed parking garages in high rises that have mechanical access shall increase the secondary water tank size per Administrative Rule 9.03.20, *Automatic Sprinkler and Standpipe Systems*, and any future revisions of this rule adopted by the fire code official.

[S] **903.2.10.3 Car-stacking equipment located in parking garages.** The equipment footprint and immediate access area for car-stacking equipment shall be protected by a specially engineered automatic sprinkler system designed by a registered design professional, when the number of cars stacked vertically exceeds two. The design shall be supported by an engineered report complying with Section 104.8 or 104.10 submitted to the fire code official. Car-stacking equipment in high-rise buildings shall increase the secondary water tank size per Administrative Rule 9.03.20, *Automatic Sprinkler and Standpipe Systems*, and any future revisions of this rule adopted by the fire code official.

**903.2.11 Specific buildings areas and hazards.** In all occupancies other than Group U, an *automatic sprinkler system* shall be installed for building design or hazards in the locations set forth in Sections 903.2.11.1 through 903.2.11.6.

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**903.2.11.1 Stories without openings.** An *automatic sprinkler system* shall be installed throughout all *stories*, including *basements*, of all buildings where the floor area exceeds 1,500 square feet (139 m<sup>2</sup>) and where the story does not comply with the following criteria for exterior wall openings:

1. Openings below grade that lead directly to ground level by an exterior *stairway* complying with Section 1011 or an outside *ramp* complying with Section 1012. Openings shall be located in each 50 linear feet (15 240 mm), or fraction thereof, of *exterior wall* in the story on not fewer than one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm).
2. Openings entirely above the adjoining ground level totaling not less than 20 square feet (1.86 m<sup>2</sup>) in each 50 linear feet (15 240 mm), or fraction thereof, of *exterior wall* in the story on not fewer than one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm). The height of the bottom of the clear opening shall not exceed 44 inches (1118 mm) measured from the floor.

**903.2.11.1.1 Opening dimensions and access.** Openings shall have a minimum dimension of not less than 30 inches (762 mm). *Access* to such openings shall be provided for the fire department from the exterior and shall not be obstructed in a manner such that fire fighting or rescue cannot be accomplished from the exterior.

**903.2.11.1.2 Openings on one side only.** Where openings in a story are provided on only one side and the opposite wall of such story is more than 75 feet (22 860 mm) from such openings, the story shall be equipped throughout with an *approved automatic sprinkler system*, or openings shall be provided on not fewer than two sides of the story.

**[W] 903.2.11.1.3 Basements.** Where any portion of a *basement* is located more than 75 feet (22 860 mm) from openings required by Section 903.2.11.1, or where new walls, partitions or other similar obstructions are installed that ~~((restrict the application of water from hose streams;))~~ increase the exit travel distance to more than 75 feet (22 860 mm), the *basement* shall be equipped throughout with an *approved automatic sprinkler system*.

**903.2.11.2 Rubbish and linen chutes.** An *automatic sprinkler system* shall be installed at the top of rubbish and linen chutes and in their terminal rooms. Chutes shall have additional sprinkler heads installed at alternate floors and at the lowest intake. Where a rubbish chute extends through a building more than one floor below the lowest intake, the extension shall have sprinklers installed that are recessed from the drop area of the chute and protected from freezing in accordance with Section 903.3.1.1. Such sprinklers shall be installed at alternate floors, beginning with the second level below the last intake and ending with the floor above the discharge. *Access* to sprinklers in chutes shall be provided for servicing.

**903.2.11.3 Buildings 55 feet or more in height.** An *automatic sprinkler system* shall be installed throughout buildings that have one or more stories with an *occupant load* of 30 or more located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access, measured to the finished floor.

**Exception:** Occupancies in Group F-2.

**903.2.11.4 Ducts conveying hazardous exhausts.** Where required by the *International Mechanical Code*, automatic sprinklers shall be provided in ducts conveying hazardous exhaust or flammable or combustible materials.

**Exception:** Ducts where the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).

**[W] 903.2.11.5 Commercial cooking operations.** An *automatic sprinkler system* shall be installed in commercial kitchen exhaust hood and duct systems where an *automatic sprinkler system* is used to comply with Section 904.

**Exception:** An automatic fire sprinkler system is not required to protect the ductwork that is in excess of 75 feet (22 860 mm) when the commercial kitchen exhaust hood is protected by a system listed per UL 300.

**[W][S] 903.2.11.6 Other required fire protection systems.** In addition to the requirements of Section 903.2, the provisions indicated in Table 903.2.11.6 require the installation of a fire protection system for certain buildings and areas.

**TABLE 903.2.11.6  
ADDITIONAL REQUIRED FIRE PROTECTION SYSTEMS**

SECTION	SUBJECT
<u>322.4.2.3</u>	<u>Lithium-ion and lithium metal battery storage</u>
903.2.10.2	Mechanical-access enclosed parking garages
914.2.1	Covered and open mall buildings
914.3.1	High-rise buildings
914.4.1	Atriums
914.5.1	Underground structures
914.6.1	Stages
914.7.1	Special amusement buildings

**TABLE 903.2.11.6—continued**  
**ADDITIONAL REQUIRED FIRE PROTECTION SYSTEMS**

SECTION	SUBJECT
914.8.2	Airport traffic control towers
914.8.3, 914.8.6	Aircraft hangars
914.9	Flammable finishes
914.10	Drying rooms
914.11.1	Ambulatory care facilities
1030.6.2.3	Smoke-protected assembly seating
1103.5.1	Existing Group A occupancies
1103.5.2	Pyroxylin plastic storage in existing buildings
1103.5.3	Existing Group I-2 occupancies
1103.5.5	Existing Group I-2, Condition 2 occupancies
1103.5.5	Pyroxylin plastics
Table 1207.7, Table 1207.8, Table 1206.9, Table 1206.10	Stationary and mobile energy storage systems
2108.2	Dry cleaning plants
2108.3	Dry cleaning machines
2309.3.1.5.2	Hydrogen motor fuel-dispensing area canopies
2404.2	Spray finishing in Group A, E, I or R
2404.4	Spray booths and spray rooms
2405.2	Dip-tank rooms in Group A, I or R
2405.4.1	Dip tanks
2405.9.4	Hardening and tempering tanks
2703.10	HPM facilities
2703.10.1.1	HPM work station exhaust
2703.10.2	HPM gas cabinets and exhausted enclosures
2703.10.3	HPM exit access corridor
2703.10.4	HPM exhaust ducts
2703.10.4.1	HPM noncombustible ducts
2703.10.4.2	HPM combustible ducts
2807.3	Lumber production conveyor enclosures
2808.7	Recycling facility conveyor enclosures
3006.1	Class A and B ovens
3006.2	Class C and D ovens
Table 3206.2	Storage fire protection
3206.4	Storage
3210.1.1	Record storage over 12 feet
3704.5	Storage of more than 1,000 cubic feet of loose combustible fibers
5003.8.4.1	Gas rooms
5003.8.5.3	Exhausted enclosures
5004.5	Indoor storage of hazardous materials
5005.1.8	Indoor dispensing of hazardous materials
5104.4.1	Aerosol product warehouses
5106.3.2	Aerosol display and merchandising areas
5306.2.1	Exterior medical gas storage room
5306.2.2	Interior medical gas storage room
5306.2.3	Medical gas storage cabinet
5606.5.2.1	Storage of smokeless propellant
5606.5.2.3	Storage of small arms primers

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**TABLE 903.2.11.6—continued**  
**ADDITIONAL REQUIRED FIRE PROTECTION SYSTEMS**

SECTION	SUBJECT
5704.3.7.5.1	Flammable and combustible liquid storage rooms
5704.3.8.4	Flammable and combustible liquid storage warehouses
5705.3.7.3	Flammable and combustible liquid Group H-2 or H-3 areas
6004.1.2	Gas cabinets for highly toxic and toxic gas
6004.1.3	Exhausted enclosures for highly toxic and toxic gas
6004.2.2.6	Gas rooms for highly toxic and toxic gas
6004.3.3	Outdoor storage for highly toxic and toxic gas
6504.1.1	Pyroxylin plastic storage cabinets
6504.1.3	Pyroxylin plastic storage vaults
6504.2	Pyroxylin plastic storage and manufacturing

For SI: 1 cubic foot = 0.023 m<sup>3</sup>.

**[W] 903.2.11.7 Relocatable buildings within buildings.** Relocatable buildings or structures located within a building with an *approved* fire sprinkler system shall be provided with fire sprinkler protection within the occupiable space of the building and the space underneath the relocatable building.

**Exceptions:**

1. Sprinkler protection is not required underneath the building when the space is separated from the adjacent space by construction resisting the passage of smoke and heat and combustible storage will not be located there.
2. If the building or structure does not have a roof or ceiling obstructing the overhead sprinklers.
3. Construction trailers and temporary offices used during new building construction prior to occupancy.
4. Movable shopping mall kiosks with a roof or canopy dimension of less than 4 feet (1219 mm) on the smallest side.

**903.2.12 During construction.** *Automatic sprinkler systems* required during construction, *alteration* and demolition operations shall be provided in accordance with Section 3314.

**[S] 903.2.13 Privacy booths and temporarily occupied small enclosures.** Enclosures shall not be required to provide automatic fire sprinkler protection when the enclosure does not extend to within the horizontal plane 18 inches (457 mm) below the sprinkler deflector, the enclosure does not exceed 4 feet (1219 mm) in length or width, and the enclosures are separated from building wall construction and other such enclosures by not less than 6 inches (152 mm).

**903.3 Installation requirements.** *Automatic sprinkler systems* shall be designed and installed in accordance with Sections 903.3.1 through 903.3.8.

**[S] 903.3.1 Standards.** Sprinkler systems shall be designed and installed in accordance with Section 903.3.1.1, unless otherwise permitted by Sections 903.3.1.2 and 903.3.1.3, Administrative Rule 9.03.20, *Automatic Sprinkler and Standpipe Systems*, and any future revisions of this rule adopted by the fire code official, and other chapters of this code, as applicable.

**903.3.1.1 NFPA 13 sprinkler systems.** Where the provisions of this code require that a building or portion thereof be equipped throughout with an *automatic sprinkler system* in accordance with this section, sprinklers shall be installed throughout in accordance with NFPA 13 except as provided in Sections 903.3.1.1.1 and 903.3.1.1.2.

**[S] 903.3.1.1.1 Exempt locations.** Automatic sprinklers shall not be required in the following rooms or areas where such rooms or areas are protected with an *approved* automatic fire detection system in accordance with Section 907.2 that will respond to visible or invisible particles of combustion. Sprinklers shall not be omitted from a room merely because it is damp, of *fire-resistance-rated* construction or contains electrical equipment.

1. A room where the application of water, or flame and water, constitutes a serious life or fire hazard when approved by the fire code official.
2. A room or space where sprinklers are considered undesirable because of the nature of the contents, where approved by the fire code official.
3. ~~((Generator and transformer rooms))~~ Transformer vaults separated from the remainder of the building by walls and floor/ceiling or roof/ceiling assemblies having a *fire-resistance rating* of not less than ~~((2))~~ 3 hours.
4. Rooms or areas that are of noncombustible construction with wholly noncombustible contents.
5. ~~((Fire service access elevator machine rooms and machinery spaces))~~ Machine rooms, machinery spaces, control rooms and control spaces in accordance with Administrative Rule 9.06.14, *Sprinkler Systems and*

Fire Alarms for Elevator Machinery Rooms, Hoist Ways and Pits, and any future revisions of this rule adopted by the fire code official.

((6. Machine rooms, machinery spaces, control rooms and control spaces associated with occupant evacuation elevators designed in accordance with Section 3008 of the *International Building Code*.)

**903.3.1.1.2 Bathrooms.** In Group R occupancies, sprinklers shall not be required in bathrooms that do not exceed 55 square feet (5 m<sup>2</sup>) in area and are located within individual *dwelling units* or *sleeping units*, provided that walls and ceilings, including the walls and ceilings behind a shower enclosure or tub, are of noncombustible or limited-combustible materials with a 15-minute thermal barrier rating.

**[S] 903.3.1.1.3 High-rise building sprinkler system design.** High-rise building automatic fire sprinkler systems shall be combination standpipe/sprinkler systems incorporating the following features:

1. Each floor automatic fire sprinkler system shall be connected between standpipe risers.
2. Shut-off valves, water-flow devices and check valves (or pressure reducing valves) shall be provided on each floor at the sprinkler system connection to each standpipe.
3. Two four-way fire department connections serving the combination system shall be provided per Section 912.2.3.
4. At least one of the fire department connections shall be connected to the riser above a riser isolation valve. At least one fire department connection shall be located on the address side of the building.
5. When a mid-level fire pump is required to meet pressure requirements, two pumps with the same rating shall be installed.
6. Dry-pipe sprinkler systems serving parking garages may use separate two-way fire department connection. The dry-pipe sprinkler system shall be supplied by the on-site water tank.
7. The standpipe risers in each required stair shall be a minimum pipe size of 6 inches (152 mm).
8. Two 2-1/2-inch (64 mm) hose connections shall be provided on every floor level landing in every required stairway. If pressure reducing valves (PRV) are required, each hose connection shall be provided with its own PRV.
9. The system shall be designed to provide a minimum flow of 300 gpm (19 L/s) at a minimum pressure of 150 psi (1034 kPa) [maximum 205 psi (1379 kPa)] at each standpipe connection in addition to the flow and pressure requirements contained in NFPA 14.

**[W] 903.3.1.2 NFPA 13R sprinkler systems.** Automatic sprinkler systems in Group R occupancies up to and including four stories in height in buildings not exceeding 60 feet (18 288 mm) in height above grade plane shall be permitted to be installed throughout in accordance with NFPA 13R ((where the Group R occupancy meets all of the following conditions:

1. Four stories or less above grade plane.
2. The floor level of the highest story is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access.
3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.))

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the *International Building Code* shall be measured from ((grade plane)) the horizontal assembly creating separate buildings.

**[S] 903.3.1.2.1 Balconies and decks.** Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of *dwelling units* and *sleeping units*, where there is a roof or deck above having a combined projection and/or building recess of more than 4 feet (1219 mm) in depth, where either of the following conditions exists:

1. The building is of Type V construction, provided that there is a roof or deck above.
2. Exterior balconies, decks and ground floor patios of *dwelling units* and *sleeping units* are constructed in accordance with Section 705.2.3.1, Exception 3 of the *International Building Code*.

**903.3.1.2.1 Point of Information**

See SBC Section 705.2.3.1, Exception 3, and Code Alternate CA705.2 for additional information.

Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies and decks that are constructed of open wood joist construction.

**903.3.1.2.2 Corridors and balconies in the means of egress.** Sprinkler protection shall be provided in *corridors* and for balconies in the *means of egress* where any of the following conditions apply:

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1. *Corridors* with combustible floor or walls.
2. *Corridors* with an interior change of direction exceeding 45 degrees (0.79 rad).
3. *Corridors* that are less than 50 percent open to the outside atmosphere at the ends.
4. Open-ended *corridors* and associated exterior *stairways* and ramps as specified in Section 1027.6, Exception 3.
5. Egress balconies not complying with Sections 1021.2 and 1021.3.

**903.3.1.2.3 Attics.** Attic protection shall be provided as follows:

1. Attics that are used or intended for living purposes or storage shall be protected by an *automatic sprinkler system*.
2. Where fuel-fired equipment is installed in an unsprinklered attic, not fewer than one quick-response intermediate temperature sprinkler shall be installed above the equipment.
3. Where located in a building of Type III, Type IV or Type V construction designed in accordance with Section 510.2 or 510.4 of the *International Building Code*, attics not required by Item 1 to have sprinklers shall comply with one of the following if the roof assembly is located more than 55 feet (16 764 mm) above the lowest level of fire department vehicle access needed to meet the provisions in Section 503:
  - 3.1. Provide *automatic sprinkler system* protection.
  - 3.2. Construct the attic using noncombustible materials.
  - 3.3. Construct the attic using fire-retardant-treated wood complying with Section 2303.2 of the *International Building Code*.
  - 3.4. Fill the attic with noncombustible insulation.

The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance. For the purpose of this measurement, required fire vehicle access roads shall include only those roads that are necessary for compliance with Section 503.

4. Group R-4, Condition 2 occupancy attics not required by Item 1 to have sprinklers shall comply with one of the following:
  - 4.1. Provide *automatic sprinkler system* protection.
  - 4.2. Provide a heat detection system throughout the attic that is arranged to activate the building fire alarm system.
  - 4.3. Construct the attic using noncombustible materials.
  - 4.4. Construct the attic using fire-retardant-treated wood complying with Section 2303.2 of the *International Building Code*.
  - 4.5. Fill the attic with noncombustible insulation.

**[S] 903.3.1.3 NFPA 13D sprinkler systems.** *Automatic sprinkler systems* installed in one- and two-family *dwelling*s; Group R-3; Group R-4, Condition 1; and *townhouses* three stories or less; or when approved by the fire code official, shall be permitted to be installed throughout in accordance with NFPA 13D.

**903.3.2 Quick-response and residential sprinklers.** Where *automatic sprinkler systems* are required by this code, quick-response or residential automatic sprinklers shall be installed in all of the following areas in accordance with Section 903.3.1 and their listings:

1. Throughout all spaces within a *smoke compartment* containing care recipient *sleeping units* in Group I-2 in accordance with the *International Building Code*.
2. Throughout all spaces within a *smoke compartment* containing gas fireplace appliances and decorative gas appliances in Group I-2 in accordance with the *International Building Code*.
3. Throughout all spaces within a *smoke compartment* containing treatment rooms in ambulatory care facilities.
4. *Dwelling units* and *sleeping units* in Group I-1 and R occupancies.
5. Light-hazard occupancies as defined in NFPA 13.

**[S] 903.3.3 Obstructed locations.** Automatic sprinklers shall be installed (~~((with regard to obstructions that will delay activation or obstruct the water distribution pattern))~~) in accordance with NFPA 13 obstruction criteria and the listing requirements of the sprinkler and shall be in accordance with the applicable *automatic sprinkler system* standard that is being used. Automatic sprinklers shall be installed in or under covered kiosks, displays, booths, concession stands or equip-



ment that exceeds 4 feet (1219 mm) in width and depth. Not less than a 3-foot (914 mm) clearance shall be maintained between automatic sprinklers and the top of piles of *combustible fibers*.

**Exception:** Kitchen equipment under exhaust hoods protected with a fire-extinguishing system in accordance with Section 904.

**903.3.4 Actuation.** *Automatic sprinkler systems* shall be automatically actuated unless specifically provided for in this code.

[S] **903.3.5 Water supplies.** Water supplies for *automatic sprinkler systems* shall comply with this section and the standards referenced in Section 903.3.1. The potable water supply shall be protected against backflow in accordance with the requirements of this section and the (~~International~~) *Uniform Plumbing Code*. For connections to public waterworks systems, the water supply test report provided by Seattle Public Utilities and used for design of fire protection systems shall be adjusted (~~(to account for seasonal and daily pressure fluctuations based on information from the water supply authority and as approved)~~) in accordance with Administrative Rule 9.03.20, *Automatic Sprinkler and Standpipe Systems*, and any future revisions of this rule adopted by the fire code official.

[S] **903.3.5.1 Domestic services.** (~~Where the domestic service provides the water supply for the automatic sprinkler system, the supply shall be~~) Both NFPA 13R and NFPA 13D sprinkler systems can be supplied by a domestic service in accordance with this section.

[S] **903.3.5.2 (~~Residential combination~~) Combined fire/domestic services.** A single combination water supply shall be allowed for all types of sprinkler systems provided that when required by the applicable sprinkler standard, the domestic demand is added to the sprinkler demand (~~(as required by)~~) in accordance with the domestic tables in NFPA 13R.

[S] **903.3.5.3 Fire service.** A fire service utility connection shall be allowed for all types of sprinkler piping.

[W] **903.3.5.4 Underground portions of fire protection system water supply piping.** The installation or modification of an underground water main, public or private, supplying a water-based fire protection system shall be in accordance with NFPA 24 and chapter 18.160 RCW. Piping and appurtenances downstream of the first control valve on the lateral or service line from the distribution main to one foot (305 mm) above finished floor shall be approved by the fire code official. Such underground piping shall be installed by a fire sprinkler system contractor licensed in accordance with chapter 18.160 RCW and holding either a Level U or a Level 3 license. For underground piping supplying systems installed in accordance with Section 903.3.1.2, a Level 2,3, or U licensed contractor is acceptable.

**Exceptions:**

1. Portions of underground piping supplying automatic sprinkler systems installed in accordance with Section 903.3.1.3.
2. Portions of underground water mains serving sprinkler systems that are designed and installed in accordance with Section 903.3.1.2 and are less than 4 inches (100 mm) in nominal diameter.

**903.3.6 Hose threads.** Fire hose threads and fittings used in connection with *automatic sprinkler systems* shall be as prescribed by the *fire code official*.

**903.3.7 Fire department connections.** Fire department connections for *automatic sprinkler systems* shall be installed in accordance with Section 912.

**903.3.8 Limited area sprinkler systems.** Limited area sprinkler systems shall be in accordance with the standards listed in Section 903.3.1 except as provided in Sections 903.3.8.1 through 903.3.8.5.

**903.3.8.1 Number of sprinklers.** Limited area sprinkler systems shall not exceed six sprinklers in any single *fire area*.

**903.3.8.2 Occupancy hazard classification.** Only areas classified by NFPA 13 as Light Hazard or Ordinary Hazard Group 1 shall be permitted to be protected by limited area sprinkler systems.

**903.3.8.3 Piping arrangement.** Where a limited area sprinkler system is installed in a building with an automatic wet standpipe system, sprinklers shall be supplied by the standpipe system. Where a limited area sprinkler system is installed in a building without an automatic wet standpipe system, water shall be permitted to be supplied by the plumbing system provided that the plumbing system is capable of simultaneously supplying domestic and sprinkler demands.

**903.3.8.4 Supervision.** Control valves shall not be installed between the water supply and sprinklers unless the valves are of an *approved* indicating type that are supervised or secured in the open position.

**903.3.8.5 Calculations.** Hydraulic calculations in accordance with NFPA 13 shall be provided to demonstrate that the available water flow and pressure are adequate to supply all sprinklers installed in any single *fire area* with discharge densities corresponding to the hazard classification.

[S] **903.4 Sprinkler system supervision and alarms.** Valves controlling the water supply for *automatic sprinkler systems*, pumps, tanks, water levels and temperatures, critical air pressures and waterflow switches on all sprinkler systems shall be electrically supervised by a *listed* fire alarm control unit.

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### Exceptions:

1. Automatic sprinkler systems protecting one- and two-family dwellings and townhouses where each townhouse unit is provided with a dedicated sprinkler system, or if approved by the fire code official.
2. Limited area sprinkler systems in accordance with Section 903.3.8.
3. Automatic sprinkler systems installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the automatic sprinkler system, and a separate shutoff valve for the automatic sprinkler system is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.
8. ~~((Underground key or hub gate valves in roadway boxes.))~~ Valves provided by the municipality or public utility are not required to be monitored.

**903.4.1 Monitoring.** Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an *approved* supervising station or, where *approved* by the *fire code official*, shall sound an audible signal at a constantly attended location.

**Exception:** Backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.

**903.4.2 Alarms.** An *approved* audible device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a fire alarm system is installed, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

**903.4.3 Floor control valves.** *Approved* supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.

**903.5 Testing and maintenance.** Automatic sprinkler systems shall be tested and maintained in accordance with Section 901.

**903.6 Where required in existing buildings and structures.** An *automatic sprinkler system* shall be provided in existing buildings and structures where required in Chapter 11.

## SECTION 904 ALTERNATIVE AUTOMATIC FIRE-EXTINGUISHING SYSTEMS

**904.1 General.** Automatic fire-extinguishing systems, other than *automatic sprinkler systems*, shall be designed, installed, inspected, tested and maintained in accordance with the provisions of this section and the applicable referenced standards.

**[W][S] 904.1.1 Certification of service personnel for fire-extinguishing equipment.** Service personnel ~~((providing))~~ performing system design, installation or conducting system maintenance or testing on automatic fire-extinguishing systems, other than *automatic sprinkler systems*, shall possess ~~((a valid certificate issued by an approved governmental agency, or other approved organization for the type of system and work performed))~~ the appropriate ICC/NAFED certification.

**[W] 904.1.1.1 Pre-engineered kitchen fire-extinguishing systems.** A current ICC/NAFED certification for pre-engineered kitchen fire-extinguishing systems is required when performing design, installation, inspection/testing or maintenance on kitchen suppression systems.

**[W] 904.1.1.2 Engineered fire suppression systems.** A current ICC/NAFED certification for engineered fire suppression systems is required when performing design, installation, inspection/testing or maintenance.

**[W] 904.1.1.3 Pre-engineered industrial fire-extinguishing system.** A current ICC/NAFED certification for pre-engineered industrial fire-extinguishing system is required when performing design, installation, inspection/testing or maintenance.

**[W] Effective July 1, 2024**

**[W] 904.1.1 Certification of personnel for alternative fire-extinguishing equipment.** Personnel performing system design, installation, maintenance, programming or testing on automatic fire-extinguishing systems, other than *automatic*

sprinkler systems, shall possess the appropriate National Institute for Certification in Engineering Technologies (NICET) Special Hazards Suppression Systems certification.

**EXCEPTION:** A current ICC/NAFED certification for preengineered kitchen fire extinguishing system technician is allowed in lieu of NICET Level II or higher in *Special Hazards Suppression Systems* for the design, installation, inspection/testing or maintenance on preengineered kitchen suppression systems.

~~((**[W]** 904.1.1.1 **Pre-engineered kitchen fire extinguishing systems.** A current ICC/NAFED certification for pre-engineered kitchen fire extinguishing systems is required when performing design, installation, inspection/testing or maintenance on kitchen suppression systems.))~~

~~**[W]** 904.1.1.2 **Engineered fire suppression systems.** A current ICC/NAFED certification for engineered fire suppression systems is required when performing design, installation, inspection/testing or maintenance.~~

~~**[W]** 904.1.1.3 **Pre-engineered industrial fire extinguishing system.** A current ICC/NAFED certification for pre-engineered industrial fire extinguishing system is required when performing design, installation, inspection/testing or maintenance.))~~

**904.1.1.1 Design.** All construction documents shall be reviewed by a NICET Level III in special hazard suppression systems or a licensed professional engineer (PE) in the state of Washington prior to being submitted for permitting. The reviewing professional shall submit a stamped, signed, and dated letter; or a verification method *approved* by the *fire code official* indicating the system has been reviewed and meets or exceeds the design requirements of the state of Washington and the local jurisdiction.

**904.1.1.2 Installation.** Installation not defined as “electrical construction trade” by chapter 19.28 RCW or “Fire Protection Sprinkler Fitting” by chapter 18.270 RCW, shall be completed by or directly supervised by a NICET Level II or higher in *special hazards suppression systems*. Supervision shall consist of a person being on the same job site and under the control of a NICET Level II or higher in *special hazards suppression systems*.

**904.1.1.3 Testing/maintenance.** Inspection, testing, commissioning, maintenance, and programming not defined as “electrical construction trade” by chapter 19.28 RCW or “Fire Protection Sprinkler Fitting” by chapter 18.270 RCW, shall be completed by a NICET Level II or higher in *special hazards suppression systems*.

**904.2 Where permitted.** Automatic fire-extinguishing systems installed as an alternative to the required *automatic sprinkler systems* of Section 903 shall be *approved* by the *fire code official*.

**904.2.1 Restriction on using automatic sprinkler system exceptions or reductions.** Automatic fire-extinguishing systems shall not be considered alternatives for the purposes of exceptions or reductions allowed for *automatic sprinkler systems* or by other requirements of this code.

**904.2.2 Commercial hood and duct systems.** Each required commercial kitchen exhaust hood and duct system required by Section 606 to have a Type I hood shall be protected with an *approved* automatic fire-extinguishing system installed in accordance with this code.

**[S] 904.3 Installation.** Automatic fire-extinguishing systems shall be installed in accordance with this section.

**904.3.1 Electrical wiring.** Electrical wiring shall be in accordance with ~~((NFPA 70))~~ the Seattle Electrical Code.

**904.3.2 Actuation.** Automatic fire-extinguishing systems shall be automatically actuated and provided with a manual means of actuation in accordance with Section 904.13.1. Where more than one hazard could be simultaneously involved in fire due to their proximity, all hazards shall be protected by a single system designed to protect all hazards that could become involved.

**Exception:** Multiple systems shall be permitted to be installed if they are designed to operate simultaneously.

**904.3.3 System interlocking.** Automatic equipment interlocks with fuel shutoffs, ventilation controls, door closers, window shutters, conveyor openings, smoke and heat vents and other features necessary for proper operation of the fire-extinguishing system shall be provided as required by the design and installation standard utilized for the hazard.

**904.3.4 Alarms and warning signs.** Where alarms are required to indicate the operation of automatic fire-extinguishing systems, distinctive audible, visible alarms and warning signs shall be provided to warn of pending agent discharge. Where exposure to automatic-extinguishing agents poses a hazard to persons and a delay is required to ensure the evacuation of occupants before agent discharge, a separate warning signal shall be provided to alert occupants once agent discharge has begun. Audible signals shall be in accordance with Section 907.5.2.

**904.3.5 Monitoring.** Where a building fire alarm system is installed, automatic fire-extinguishing systems shall be monitored by the building fire alarm system in accordance with NFPA 72.

**[S] 904.3.6 Pollution-control units.** Where installed, pollution-control units and the fire suppression systems shall be interlocked per NFPA 96 or the equipment manufacturers installation instructions.

**904.4 Inspection and testing.** Automatic fire-extinguishing systems shall be inspected and tested in accordance with the provisions of this section prior to acceptance.

## FIRE PROTECTION AND LIFE SAFETY SYSTEMS

**[W] 904.13 Commercial cooking systems.** The automatic fire-extinguishing system for commercial cooking systems shall be of a type recognized for protection of commercial cooking equipment and exhaust systems of the type and arrangement protected. Preengineered automatic dry- and wet-chemical extinguishing systems shall be tested in accordance with UL 300 and *listed* and *labeled* for the intended application. Other types of automatic fire-extinguishing systems shall be *listed* and *labeled* for specific use as protection for commercial cooking operations. The system shall be installed in accordance with this code, NFPA 96, its listing and the manufacturer's installation instructions. Additional protection is not required for ductwork beyond 75 feet (22 860 mm) when the hood suppression system complies with UL 300. Signage shall be provided on the exhaust hood or system cabinet, indicating the type and arrangement of cooking appliances protected by the automatic fire extinguishing system. Signage shall indicate appliances from left to right, be durable, and the size and color and lettering shall be approved. Automatic fire-extinguishing systems of the following types shall be installed in accordance with the referenced standard indicated, as follows:

1. Carbon dioxide extinguishing systems, NFPA 12.
2. *Automatic sprinkler systems*, NFPA 13.
3. Automatic water mist systems, NFPA 750.
4. Foam-water sprinkler system or foam-water spray systems, NFPA 16.
5. Dry-chemical extinguishing systems, NFPA 17.
6. Wet-chemical extinguishing systems, NFPA 17A.

### Exceptions:

1. Factory-built commercial cooking recirculating systems that are tested in accordance with UL 710B and *listed*, *labeled* and installed in accordance with Section 304.1 of the *International Mechanical Code*.
2. Protection of duct systems beyond 75 feet (22 860 mm) when the commercial kitchen exhaust hood is protected by a system listed in accordance with UL 300.

**904.13.1 Manual system operation.** A manual actuation device shall be located at or near a *means of egress* from the cooking area not less than 10 feet (3048 mm) and not more than 20 feet (6096 mm) from the kitchen exhaust system. The manual actuation device shall be installed not more than 48 inches (1200 mm) nor less than 42 inches (1067 mm) above the floor and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

**Exception:** *Automatic sprinkler systems* shall not be required to be equipped with manual actuation means.

**904.13.2 System interconnection.** The actuation of the fire extinguishing system shall automatically shut down the fuel or electrical power supply to the cooking equipment. The fuel and electrical supply reset shall be manual.

**904.13.3 Carbon dioxide systems.** Where carbon dioxide systems are used, there shall be a nozzle at the top of the ventilating duct. Additional nozzles that are symmetrically arranged to give uniform distribution shall be installed within vertical ducts exceeding 20 feet (6096 mm) and horizontal ducts exceeding 50 feet (15 240 mm). Dampers shall be installed at either the top or the bottom of the duct and shall be arranged to operate automatically upon activation of the fire-extinguishing system. Where the damper is installed at the top of the duct, the top nozzle shall be immediately below the damper. Automatic carbon dioxide fire-extinguishing systems shall be sufficiently sized to protect all hazards venting through a common duct simultaneously.

**904.13.3.1 Ventilation system.** Commercial-type cooking equipment protected by an automatic carbon dioxide extinguishing system shall be arranged to shut off the ventilation system upon activation.

**904.13.4 Special provisions for automatic sprinkler systems.** *Automatic sprinkler systems* protecting commercial-type cooking equipment shall be supplied from a separate, indicating-type control valve that is identified. *Access* to the control valve shall be provided.

**904.13.4.1 Listed sprinklers.** Sprinklers used for the protection of fryers shall be tested in accordance with UL 199E, *listed* for that application and installed in accordance with their listing.

**904.13.5 Operations and maintenance.** Automatic fire-extinguishing systems protecting commercial cooking systems shall be maintained in accordance with Sections 904.13.5.1 through 904.13.5.3.

**904.13.5.1 Existing automatic fire-extinguishing systems.** Where changes in the cooking media, positioning of cooking equipment or replacement of cooking equipment occur in existing commercial cooking systems, the automatic fire-extinguishing system shall be required to comply with the applicable provisions of Sections 904.13 through 904.13.4.

**904.13.5.2 Extinguishing system service.** Automatic fire-extinguishing systems shall be serviced not less frequently than every six months and after activation of the system. Inspection shall be by qualified individuals, and a certificate of inspection shall be forwarded to the *fire code official* upon completion.

**904.13.5.3 Fusible link and sprinkler head replacement.** Fusible links and automatic sprinkler heads shall be replaced annually, and other protection devices shall be serviced or replaced in accordance with the manufacturer's instructions.

**Exception:** Frangible bulbs are not required to be replaced annually.

**904.14 Domestic cooking facilities.** Cooktops and ranges installed in the following occupancies shall be protected in accordance with Section 904.14.1:

1. In Group I-1 occupancies where domestic cooking facilities are installed in accordance with Section 420.9 of the *International Building Code*.
2. In Group I-2 occupancies where domestic cooking facilities are installed in accordance with Section 407.2.7 of the *International Building Code*.
3. In Group R-2 college dormitories where domestic cooking facilities are installed in accordance with Section 420.11 of the *International Building Code*.

**904.14.1 Protection from fire.** Cooktops and ranges shall be protected in accordance with Section 904.14.1.1 or 904.14.1.2.

**904.14.1.1 Automatic fire-extinguishing system.** The domestic recirculating or exterior vented cooking hood provided over the cooktop or range shall be equipped with an *approved* automatic fire-extinguishing system complying with the following:

1. The automatic fire-extinguishing system shall be of a type recognized for protection of domestic cooking equipment. Preengineered automatic fire-extinguishing systems shall be *listed* and *labeled* in accordance with UL 300A and installed in accordance with the manufacturer's instructions.
2. Manual actuation of the fire-extinguishing system shall be provided in accordance with Section 904.13.1.
3. Interconnection of the fuel and electric power supply shall be in accordance with Section 904.13.2.

**904.14.1.2 Ignition prevention.** Cooktops and ranges shall include burners that have been tested and *listed* to prevent ignition of cooking oil with burners turned on to their maximum heat settings and allowed to operate for 30 minutes.

## SECTION 905 STANDPIPE SYSTEMS

**905.1 General.** Standpipe systems shall be provided in new buildings and structures in accordance with Sections 905.2 through 905.11. In buildings used for *high-piled combustible storage*, fire protection shall be in accordance with Chapter 32.

**[S] 905.2 Installation standard.** Standpipe systems shall be installed in accordance with this section, Administrative Rule 9.03.20, *Automatic Sprinkler and Standpipe Systems*, and any future revisions of this rule adopted by the fire code official and NFPA 14. Fire department connections for standpipe systems shall be in accordance with Section 912.

**[S] 905.3 Required installations.** Standpipe systems shall be installed where required by Sections 905.3.1 through ~~(905.3.8)~~ 905.3.7. Standpipe systems are allowed to be combined with *automatic sprinkler systems*.

**Exception:** Standpipe systems are not required in ~~((Group R-3 occupancies))~~ one- and two-family dwellings and townhouses.

**905.3.1 Height.** Class III standpipe systems shall be installed throughout buildings where any of the following conditions exist:

1. Four or more stories are above or below *grade plane*.
- ~~((2. The floor level of the highest story is located more than 30 feet (9144 mm) above the lowest level of the fire department vehicle access.))~~
- ~~((3))~~ 2. The floor level of the lowest story is located more than 30 feet (9144 mm) below the highest level of fire department vehicle access.

**Exceptions:**

1. Class I standpipes are allowed in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
2. Class I standpipes are allowed in Group B and E occupancies.
3. Class I standpipes are allowed in parking garages.
4. Class I standpipes are allowed in *basements* equipped throughout with an *automatic sprinkler system*.
5. Class I standpipes are allowed in buildings where occupant-use hose lines will not be utilized by trained personnel or the fire department.

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6. In determining the lowest level of fire department vehicle access, it shall not be required to consider either of the following:
  - 6.1. Recessed loading docks for four vehicles or less.
  - 6.2. Conditions where topography makes access from the fire department vehicle to the building impractical or impossible.

**905.3.2 Group A.** Class I automatic wet standpipes shall be provided in nonsprinklered Group A buildings having an *occupant load* exceeding 1,000 persons.

### Exceptions:

1. Open-air-seating spaces without enclosed spaces.
2. Class I automatic dry and semiautomatic dry standpipes or manual wet standpipes are allowed in buildings that are not high-rise buildings.

**[S] 905.3.3 Covered and open mall buildings.** Covered mall and open mall buildings shall be equipped throughout with a Class I standpipe system (~~(where required by Section 905.3.1. Mall buildings not required to be equipped with a standpipe system by Section 905.3.1 shall be equipped with Class I hose connections connected to the automatic sprinkler system sized to deliver water at 250 gallons per minute (946.4 L/min) at the hydraulically most remote hose connection while concurrently supplying the automatic sprinkler system demand. The standpipe system shall be designed not to exceed a 50 pounds per square inch (psi) (345 kPa) residual pressure loss with a flow of 250 gallons per minute (946.4 L/min) from the fire department connection to the hydraulically most remote hose connection. Hose))~~ with hose connections (~~((shall be))~~) provided at each of the following locations:

1. Within the mall at the entrance to each *exit passageway* or *corridor*.
2. At each floor-level landing within *interior exit stairways* opening directly on the mall.
3. At exterior public entrances to the mall of a covered mall building.
4. At public entrances at the perimeter line of an open mall building.
5. At other locations as necessary so that the distance to reach all portions of a tenant space does not exceed 200 feet (60 960 mm) from a hose connection.

~~((905.3.4 Stages. Stages greater than 1,000 square feet (93 m<sup>2</sup>) in area shall be equipped with a Class III wet standpipe system with 1-1/2 inch and 2-1/2 inch (38 mm and 64 mm) hose connections on each side of the stage.~~

~~**Exception:** Where the building or area is equipped throughout with an *automatic sprinkler system*, a 1-1/2 inch (38 mm) hose connection shall be installed in accordance with NFPA 13 or in accordance with NFPA 14 for Class II or III standpipes.~~

~~**905.3.4.1 Hose and cabinet.** The 1-1/2 inch (38 mm) hose connections shall be equipped with sufficient lengths of 1-1/2 inch (38 mm) hose to provide fire protection for the stage area. Hose connections shall be equipped with an *approved* adjustable fog nozzle and be mounted in a cabinet or on a rack.))~~

~~((905.3.5))~~ **905.3.4 Underground buildings.** Underground buildings shall be equipped throughout with a Class I automatic wet or manual wet standpipe system.

~~((905.3.6))~~ **905.3.5 Helistops and heliports.** Buildings with a rooftop *helistop* or *heliport* shall be equipped with a Class I or III standpipe system extended to the roof level on which the *helistop* or *heliport* is located in accordance with Section 2007.5.

~~((905.3.7))~~ **905.3.6 Marinas and boatyards.** Standpipes in marinas and boatyards shall comply with Chapter 36.

~~((905.3.8))~~ **905.3.7 Landscaped roofs.** Buildings or structures that have landscaped roofs and that are equipped with a standpipe system shall have the standpipe system extended to the roof level on which the landscaped roof is located.

**Exception:** The standpipe system shall not be required to be extended when in compliance with Section 905.4(6).

**[S] 905.4 Location of Class I standpipe hose connections.** Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required (~~(interior))~~ *exit stairway*, a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing or intermediate landing throughout the building, unless otherwise *approved* by the *fire code official*.

**Exception:** A single hose connection shall be permitted to be installed in the open *corridor* or open breezeway between open *stairs* that are not greater than 75 feet (22 860 mm) apart.

2. On each side of the wall adjacent to the *exit* opening of a horizontal *exit*.  
**Exception:** Where floor areas adjacent to a horizontal *exit* are reachable from an *interior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal *exit*.
3. In every *exit passageway*, at the entrance from the *exit passageway* to other areas of a building.  
**Exception:** Where floor areas adjacent to an *exit passageway* are reachable from an *interior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit passageway* to other areas of the building.
4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an *exit passageway* or *exit corridor* to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an *exit passageway* or *exit corridor* to the mall.
5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an *interior exit stairway* with access to the roof provided in accordance with Section 1011.12. Hose connections on a roof shall be at least 10 feet (3048 mm) from the roof edge, skylight, light well or other opening, unless protected by an approved 42-inch-high (1067 mm) guard or equivalent.
6. Where the most remote portion of a nonsprinklered floor or story is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or story or roof is more than 200 feet (60 960 mm) from a hose connection, the *fire code official* is authorized to require that additional hose connections be provided in *approved* locations.

**905.4.1 Protection.** Risers and laterals of Class I standpipe systems not located within an *interior exit stairway* shall be protected by a degree of *fire resistance* equal to that required for vertical enclosures in the building in which they are located.

**Exception:** In buildings equipped throughout with an *approved automatic sprinkler system*, laterals that are not located within an *interior exit stairway* are not required to be enclosed within fire-resistance-rated construction.

**905.4.2 Interconnection.** In buildings where more than one standpipe is provided, the standpipes shall be interconnected in accordance with NFPA 14.

[S] **905.5 Location of Class II standpipe hose connections.** Class II standpipe hose connections shall be located so that all portions of the building are within 30 feet (9144 mm) of a nozzle attached to 100 feet (30 480 mm) of hose. Class II standpipe hose connections shall be located where they will have *ready access*.

~~((905.5.1 Groups A-1 and A-2. In Group A-1 and A-2 occupancies with *occupant loads* of more than 1,000, hose connections shall be located on each side of any stage, on each side of the rear of the auditorium, on each side of the balcony and on each tier of dressing rooms.))~~

~~((905.5.2))~~ **905.5.1 Protection.** *Fire-resistance-rated* protection of risers and laterals of Class II standpipe systems is not required.

~~((905.5.3))~~ **905.5.2 Class II system 1-inch hose.** A minimum 1-inch (25 mm) hose shall be allowed to be used for hose stations in light-hazard occupancies where investigated and *listed* for this service and where *approved* by the *fire code official*.

**905.6 Location of Class III standpipe hose connections.** Class III standpipe systems shall have hose connections located as required for Class I standpipes in Section 905.4 and shall have Class II hose connections as required in Section 905.5.

**905.6.1 Protection.** Risers and laterals of Class III standpipe systems shall be protected as required for Class I systems in accordance with Section 905.4.1.

**905.6.2 Interconnection.** In buildings where more than one Class III standpipe is provided, the standpipes shall be interconnected in accordance with NFPA 14.

**905.7 Cabinets.** Cabinets containing fire-fighting equipment, such as standpipes, fire hose, fire extinguishers or fire department valves, shall not be blocked from use or obscured from view.

**905.7.1 Cabinet equipment identification.** Cabinets shall be identified in an *approved* manner by a permanently attached sign with letters not less than 2 inches (51 mm) high in a color that contrasts with the background color, indicating the equipment contained therein.

**Exceptions:**

1. Doors not large enough to accommodate a written sign shall be marked with a permanently attached pictogram of the equipment contained therein.
2. Doors that have either an *approved* visual identification clear glass panel or a complete glass door panel are not required to be marked.

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**905.7.2 Locking cabinet doors.** Cabinets shall be unlocked.

**Exceptions:**

1. Visual identification panels of glass or other *approved* transparent frangible material that is easily broken and allows access.
2. *Approved* locking arrangements.
3. Group I-3 occupancies.

**905.8 Dry standpipes.** Dry standpipes shall not be installed.

**Exception:** Where subject to freezing and in accordance with NFPA 14.

**[S] 905.9 Valve supervision.** Valves controlling water supplies shall be supervised in the open position so that a change in the normal position of the valve will generate a supervisory signal at the supervising station required by Section 903.4. Where a fire alarm system is provided, a signal shall be transmitted to the control unit.

**Exceptions:**

1. Valves (~~(to underground key or hub valves in roadway boxes)~~) do not require supervision.
2. Valves locked in the normal position and inspected as provided in this code in buildings not equipped with a fire alarm system or approved supervising station.

**905.10 During construction.** Standpipe systems required during construction and demolition operations shall be provided in accordance with Section 3313.

**905.11 Locking standpipe outlet caps.** The *fire code official* is authorized to require locking caps on the outlets on standpipes where the responding fire department carries key wrenches for the removal that are compatible with locking FDC connection caps.

**905.12 Existing buildings.** Where required in Chapter 11, existing structures shall be equipped with standpipes installed in accordance with Section 905.

## SECTION 906 PORTABLE FIRE EXTINGUISHERS

**[S] 906.1 Where required.** Portable fire extinguishers shall be installed in all of the following locations:

1. In new and existing Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies.

**Exceptions:**

1. In Group R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 1-A:10-B:C.
2. In Group E occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each classroom is provided with a portable fire extinguisher having a minimum rating of 2-A:20-B:C.
3. In storage areas of Group S occupancies where forklift, powered industrial truck or powered cart operators are the primary occupants, fixed extinguishers, as specified in NFPA 10, shall not be required where in accordance with all of the following:
  - 3.1. Use of vehicle-mounted extinguishers shall be *approved* by the *fire code official*.
  - 3.2. Each vehicle shall be equipped with a 10-pound, (~~(4A:80B:C)~~) 4A:80B:C extinguisher affixed to the vehicle using a mounting bracket *approved* by the extinguisher manufacturer or the *fire code official* for vehicular use.
  - 3.3. Not less than two spare extinguishers of equal or greater rating shall be available on-site to replace a discharged extinguisher.
  - 3.4. Vehicle operators shall be trained in the proper operation, use and inspection of extinguishers.
  - 3.5. Inspections of vehicle-mounted extinguishers shall be performed daily.
2. Within 30 feet (9144 mm) distance of travel from commercial cooking equipment and from domestic cooking equipment in Group I-1; I-2, Condition 1; and R-2 college dormitory occupancies.
3. In areas where *flammable* or *combustible liquids* are stored, used or dispensed.
4. On each floor of structures under construction, except Group R-3 occupancies, in accordance with Section 3316.1.
5. Where required by the sections indicated in Table 906.1.



6. Special-hazard areas, including but not limited to laboratories, computer rooms and generator rooms, where required by the *fire code official*.

**Exception:** Portable fire extinguishers are not required at normally unmanned Group U occupancy buildings or structures where a portable fire extinguisher suitable to the hazard of the location is provided on the vehicle of visiting personnel.

**[S] TABLE 906.1  
ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS**

SECTION	SUBJECT
303.5	Asphalt kettles
307.5	Open burning
308.1.3	Open flames—torches
309.4	Powered industrial trucks
1204.10	Portable generators
2005.2	Aircraft towing vehicles
2005.3	Aircraft welding apparatus
2005.4	Aircraft fuel-servicing tank vehicles
2005.5	Aircraft hydrant fuel-servicing vehicles
2005.6	Aircraft fuel-dispensing stations
2007.7	Heliports and helistops
2108.4	Dry cleaning plants
2305.5	Motor fuel-dispensing facilities
2310.6.4	Marine motor fuel-dispensing facilities
2311.6	Repair garages
2404.4.1	Spray-finishing operations
2405.4.2	Dip-tank operations
2406.4.2	Powder-coating areas
2804.3	Lumberyards/woodworking facilities
2808.8	Recycling facilities
2809.5	Exterior lumber storage
2903.5	Organic-coating areas
3006.3	Industrial ovens
3107.9	Tents and membrane structures
3206.10	High-piled storage
<u>3305.10.2</u>	<u>Fire extinguishers for roofing operations</u>
<u>3306.6</u>	<u>Portable fire extinguishers</u>
<del>((3316.1))</del>	<del>((Buildings under construction or demolition))</del>
<del>((3318.3))</del>	<del>((Roofing operations))</del>
3408.2	Tire rebuilding/storage
3504.2.6	Welding and other hot work
3604.4	Marinas
3703.6	Combustible fibers
5703.2.1	Flammable and combustible liquids, general
5704.3.3.1	Indoor storage of flammable and combustible liquids
5704.3.7.5.2	Liquid storage rooms for flammable and combustible liquids
5705.4.9	Solvent distillation units
5706.2.7	Farms and construction sites—flammable and combustible liquids storage
5706.4.10.1	Bulk plants and terminals for flammable and combustible liquids
5706.5.4.5	Commercial, industrial, governmental or manufacturing establishments—fuel dispensing
5706.6.4	Tank vehicles for flammable and combustible liquids
5906.5.7	Flammable solids
6108.2	LP-gas

**906.3.3 Class C fire hazards.** Portable fire extinguishers for Class C fire hazards shall be selected and placed on the basis of the anticipated Class A or B hazard.

**906.3.4 Class D fire hazards.** Portable fire extinguishers for occupancies involving combustible metals shall be selected and placed in accordance with NFPA 10.

**906.4 Cooking equipment fires.** Fire extinguishers provided for the protection of cooking equipment shall be of an *approved* type compatible with the automatic fire-extinguishing system agent. Cooking equipment involving solid fuels or vegetable or animal oils and fats shall be protected by a Class K-rated portable extinguisher in accordance with Sections 906.1, Item 2, 906.4.1 and 906.4.2 as applicable.

**906.4.1 Portable fire extinguishers for solid fuel cooking appliances.** Solid fuel cooking appliances, whether or not under a hood, with fireboxes 5 cubic feet (0.14 m<sup>3</sup>) or less in volume shall have a minimum 2.5-gallon (9 L) or two 1.5-gallon (6 L) Class K wet-chemical portable fire extinguishers located in accordance with Section 906.1.

**906.4.2 Class K portable fire extinguishers for deep fat fryers.** Where hazard areas include deep fat fryers, *listed* Class K portable fire extinguishers shall be provided as follows:

1. For up to four fryers having a maximum cooking medium capacity of 80 pounds (36.3 kg) each: one Class K portable fire extinguisher of a minimum 1.5-gallon (6 L) capacity.
2. For every additional group of four fryers having a maximum cooking medium capacity of 80 pounds (36.3 kg) each: one additional Class K portable fire extinguisher of a minimum 1.5-gallon (6 L) capacity shall be provided.
3. For individual fryers exceeding 6 square feet (0.55 m<sup>2</sup>) in surface area: Class K portable fire extinguishers shall be installed in accordance with the extinguisher manufacturer's recommendations.

**906.5 Conspicuous location.** Portable fire extinguishers shall be located in conspicuous locations where they will have *ready access* and be immediately available for use. These locations shall be along normal paths of travel, unless the *fire code official* determines that the hazard posed indicates the need for placement away from normal paths of travel.

**906.6 Unobstructed and unobscured.** Portable fire extinguishers shall not be obstructed or obscured from view. In rooms or areas in which visual obstruction cannot be completely avoided, means shall be provided to indicate the locations of extinguishers.

**906.7 Hangers and brackets.** Hand-held portable fire extinguishers, not housed in cabinets, shall be installed on the hangers or brackets supplied. Hangers or brackets shall be securely anchored to the mounting surface in accordance with the manufacturer's installation instructions.

**906.8 Cabinets.** Cabinets used to house portable fire extinguishers shall not be locked.

**Exceptions:**

1. Where portable fire extinguishers subject to malicious use or damage are provided with a means of *ready access*.
2. In Group I-3 occupancies and in mental health areas in Group I-2 occupancies, access to portable fire extinguishers shall be permitted to be locked or to be located in staff locations provided that the staff has keys.

**906.9 Extinguisher installation.** The installation of portable fire extinguishers shall be in accordance with Sections 906.9.1 through 906.9.3.

**906.9.1 Extinguishers weighing 40 pounds or less.** Portable fire extinguishers having a gross weight not exceeding 40 pounds (18 kg) shall be installed so that their tops are not more than 5 feet (1524 mm) above the floor.

**906.9.2 Extinguishers weighing more than 40 pounds.** Hand-held portable fire extinguishers having a gross weight exceeding 40 pounds (18 kg) shall be installed so that their tops are not more than 3.5 feet (1067 mm) above the floor.

**906.9.3 Floor clearance.** The clearance between the floor and the bottom of installed hand-held portable fire extinguishers shall be not less than 4 inches (102 mm).

**906.10 Wheeled units.** Wheeled fire extinguishers shall be conspicuously located in a designated location.

## SECTION 907 FIRE ALARM AND DETECTION SYSTEMS

[S] **907.1 General.** This section covers the application, installation, performance and maintenance of fire alarm systems and their components in new and existing buildings and structures. The requirements of Section 907.2 are applicable to new buildings and structures. The requirements of Section 907.9 are applicable to existing buildings and structures.

[S] **907.1.1 Construction documents.** *Construction documents* for fire alarm systems shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code; the *International Building Code*; and relevant laws, ordinances, rules and regulations, as determined by the *fire code official*. The construction documents shall include but not be limited to the items, where applicable, listed in Sections 7.2.

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7.4.1 through 7.4.10, and 18.4.1.5.4 of NFPA 72. Emergency voice/alarm communication system construction documents shall also indicate acoustically distinguished spaces per Section 907.5.2.2.6.

**907.1.2 Fire alarm shop drawings.** ~~((Shop drawings for fire alarm systems shall be prepared in accordance with NFPA 72 and submitted for review and approval prior to system installation.))~~ All construction documents shall be reviewed by a NICET III or IV in fire alarms, an ESA/NTS Certified Fire Alarm Designer (CFAD) Level III Fire in fire alarms or a licensed Professional Engineer (PE) in Washington prior to being submitted for permitting. The reviewing professional shall submit a stamped, signed, and dated letter; or a verification method approved by the local authority having jurisdiction indicating the system has been reviewed and meets or exceeds the design requirements of the State of Washington and the local jurisdiction.

**907.1.3 Equipment.** Systems and components shall be *listed* and *approved* for the purpose for which they are installed.

**907.2 Where required—new buildings and structures.** An *approved* fire alarm system installed in accordance with the provisions of this code and NFPA 72 shall be provided in new buildings and structures in accordance with Sections 907.2.1 through 907.2.23 and provide occupant notification in accordance with Section 907.5, unless other requirements are provided by another section of this code.

Not fewer than one manual fire alarm box shall be provided in an *approved* location to initiate a fire alarm signal for fire alarm systems employing automatic fire detectors or waterflow detection devices. Where other sections of this code allow elimination of fire alarm boxes due to sprinklers, a single fire alarm box shall be installed.

### Exceptions:

1. The manual fire alarm box is not required for fire alarm systems dedicated to elevator recall control and supervisory service.
2. The manual fire alarm box is not required for Group R-2 occupancies unless required by the *fire code official* to provide a means for fire watch personnel to initiate an alarm during a sprinkler system impairment event. Where provided, the manual fire alarm box shall not be located in an area that is open to the public.

**907.2.1 Group A.** A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the *occupant load* due to the assembly occupancy is 300 or more, or where the Group A *occupant load* is more than 100 persons above or below the lowest *level of exit discharge*. Group A occupancies not separated from one another in accordance with Section 707.3.10 of the *International Building Code* shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

**Exception:** Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

**907.2.1.1 System initiation in Group A occupancies with an occupant load of 1,000 or more.** Activation of the fire alarm in Group A occupancies with an *occupant load* of 1,000 or more shall initiate a signal using an emergency voice/alarm communications system in accordance with Section 907.5.2.2.

**Exception:** Where *approved*, the prerecorded announcement is allowed to be manually deactivated for a period of time, not to exceed 3 minutes, for the sole purpose of allowing a live voice announcement from an *approved*, constantly attended location.

**907.2.1.2 Emergency voice/alarm communication system captions.** Stadiums, arenas and *grandstands* required to caption audible public announcements shall be in accordance with Section 907.5.2.2.4.

**907.2.2 Group B.** A manual fire alarm system, which activates the occupant notification system in accordance with Section 907.5, shall be installed in Group B occupancies where one of the following conditions exists:

1. The combined Group B *occupant load* of all floors is 500 or more.
2. The Group B *occupant load* is more than 100 persons above or below the lowest *level of exit discharge*.
3. The *fire area* contains an ambulatory care facility.

**Exception:** Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

**907.2.2.1 Ambulatory care facilities.** *Fire areas* containing ambulatory care facilities shall be provided with an electronically supervised automatic smoke detection system installed within the ambulatory care facility and in public use areas outside of tenant spaces, including public *corridors* and elevator lobbies.

**Exception:** Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 provided that the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

~~((907.2.3 Group E. A manual fire alarm system that initiates the occupant notification signal utilizing an emergency voice/alarm communication system meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall be installed in Group E occupancies. Where *automatic sprinkler systems* or smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system.~~

**Exceptions:**

- ~~1. A manual fire alarm system shall not be required in Group E occupancies with an *occupant load* of 50 or less.~~
- ~~2. Emergency voice/alarm communication systems meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall not be required in Group E occupancies with occupant loads of 100 or less, provided that activation of the manual fire alarm system initiates an *approved* occupant notification signal in accordance with Section 907.5.~~
- ~~3. Manual fire alarm boxes shall not be required in Group E occupancies where all of the following apply:
  - ~~3.1. Interior *corridors* are protected by smoke detectors.~~
  - ~~3.2. Auditoriums, cafeterias, gymnasiums and similar areas are protected by *heat detectors* or other *approved* detection devices.~~
  - ~~3.3. Shops and laboratories involving dusts or vapors are protected by *heat detectors* or other *approved* detection devices.~~
  - ~~3.4. Manual activation is provided from a normally occupied location.~~~~
- ~~4. Manual fire alarm boxes shall not be required in Group E occupancies where all of the following apply:
  - ~~4.1. The building is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1.~~
  - ~~4.2. The emergency voice/alarm communication system will activate on sprinkler water flow.~~
  - ~~4.3. Manual activation is provided from a normally occupied location.~~~~

**[W] 907.2.3 Group E.** Group E occupancies shall be provided with a manual fire alarm system that initiates the occupant notification signal utilizing one of the following:

1. An emergency voice/alarm communication system meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6; or
2. A system developed as part of a safe school plan adopted in accordance with RCW 28A.320.125 or developed as part of an emergency response system consistent with the provisions of RCW 28A.320.126. The system must achieve all of the following performance standards:
  - 2.1. The ability to broadcast voice messages or customized announcements;
  - 2.2. Includes a feature for multiple sounds, including sounds to initiate a lockdown;
  - 2.3. The ability to deliver messages to the interior of a building, to areas outside of a building as designated pursuant to the safe school plan, and to personnel;
  - 2.4. The ability for two-way communications;
  - 2.5. The ability for individual room calling;
  - 2.6. The ability for a manual override;
  - 2.7. Installation in accordance with NFPA 72;
  - 2.8. Provides 15 minutes of battery backup for alarm and 24 hours of battery backup for standby; and
  - 2.9. Includes a program for annual inspection and maintenance in accordance with NFPA 72.

**Exceptions:**

1. A manual fire alarm system is not required in Group E occupancies with an *occupant load* of 50 or less.
2. Emergency voice/alarm communication systems meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall not be required in Group E occupancies with occupant loads of 100 or less, such as individual portable school classroom buildings; provided that activation of the manual fire alarm system initiates an *approved* occupant notification signal in accordance with Section 907.5.
3. Where an existing *approved* alarm system is in place, an emergency voice/alarm system is not required in any portion of an existing Group E building undergoing any one of the following repairs, alteration or addition:
  - 3.1. Alteration or repair to an existing building including, without limitation, alterations to rooms and systems, and/or corridor configurations, not exceeding 35 percent of the fire area of the building (or the fire area undergoing the alteration or repair if the building is comprised of two or more fire areas); or

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- 3.2. An addition to an existing building, not exceeding 35 percent of the fire area of the building (or the fire area to which the addition is made if the building is comprised of two or more fire areas).
4. Manual fire alarm boxes are not required in Group E occupancies where all of the following apply:
  - 4.1. Interior corridors are protected by smoke detectors.
  - 4.2. Auditoriums, cafeterias, gymnasiums and similar areas are protected by heat detectors or other approved detection devices.
  - 4.3. Shops and laboratories involving dusts or vapors are protected by heat detectors or other approved detection devices.
5. Manual fire alarm boxes shall not be required in Group E occupancies where all of the following apply:
  - 5.1. The building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.
  - 5.2. The emergency voice/alarm communication system will activate on sprinkler water flow.
  - 5.3. Manual activation is provided from a normally occupied location.

**[W] 907.2.3.1 Sprinkler systems or detection.** When automatic sprinkler systems or smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system.

**907.2.4 Group F.** A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group F occupancies where both of the following conditions exist:

1. The Group F occupancy is two or more stories in height.
2. The Group F occupancy has a combined *occupant load* of 500 or more above or below the lowest *level of exit discharge*.

**Exception:** Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

**907.2.5 Group H.** A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group H-5 occupancies and in occupancies used for the manufacture of organic coatings. An automatic smoke detection system shall be installed for highly toxic gases, organic peroxides and oxidizers in accordance with Chapters 60, 62 and 63, respectively.

**[S] 907.2.6 Group I.** A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group I occupancies. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be provided in accordance with Sections 907.2.6.1, 907.2.6.2, ~~(and)~~ 907.2.6.3.3 and 907.2.6.4.

### Exceptions:

1. Manual fire alarm boxes in *sleeping units* of Group I-1 and I-2 occupancies shall not be required at *exits* if located at all care providers' control stations or other constantly attended staff locations, provided that such manual fire alarm boxes are visible and provided with *ready access*, and the distances of travel required in Section 907.4.2.1 are not exceeded.
2. Occupant notification systems are not required to be activated where private mode signaling installed in accordance with NFPA 72 is *approved* by the *fire code official* and staff evacuation responsibilities are included in the fire safety and evacuation plan required by Section 404.

**[W] 907.2.6.1 Group I-1.** An automatic smoke detection system shall be installed in *corridors*, waiting areas open to *corridors* and *habitable spaces* other than *sleeping units* and kitchens. The system shall be activated in accordance with Section ~~((907.5))~~ 907.4.

### Exceptions:

1. For Group I-1, Condition 1 occupancies, smoke detection in *habitable spaces* is not required where the facility is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1.
2. Smoke detection is not required for exterior balconies.

**907.2.6.1.1 Smoke alarms.** Single- and multiple-station smoke alarms shall be installed in accordance with Section 907.2.11.

**907.2.6.2 Group I-2.** An automatic smoke detection system shall be installed in *corridors* in Group I-2, Condition 1 facilities and spaces permitted to be open to the *corridors* by Section 407.2 of the *International Building Code*. The

system shall be activated in accordance with Section 907.4. Group I-2, Condition 2 occupancies shall be equipped with an automatic smoke detection system as required in Section 407 of the *International Building Code*.

**Exceptions:**

1. *Corridor* smoke detection is not required in *smoke compartments* that contain *sleeping units* where such units are provided with smoke detectors that comply with UL 268. Such detectors shall provide a visual display on the *corridor* side of each *sleeping unit* and shall provide an audible and visual alarm at the care providers' station attending each unit.
2. *Corridor* smoke detection is not required in *smoke compartments* that contain *sleeping units* where *sleeping unit* doors are equipped with automatic door-closing devices with integral smoke detectors on the unit sides installed in accordance with their listing, provided that the integral detectors perform the required alerting function.

**907.2.6.3 Group I-3 occupancies.** Group I-3 occupancies shall be equipped with a manual fire alarm system and automatic smoke detection system installed for alerting staff.

**907.2.6.3.1 System initiation.** Actuation of an automatic fire-extinguishing system, *automatic sprinkler system*, a manual fire alarm box or a fire detector shall initiate an *approved* fire alarm signal that automatically notifies staff.

**907.2.6.3.2 Manual fire alarm boxes.** Manual fire alarm boxes are not required to be located in accordance with Section 907.4.2 where the fire alarm boxes are provided at staff-attended locations having direct supervision over areas where manual fire alarm boxes have been omitted.

**907.2.6.3.2.1 Manual fire alarms boxes in detainee areas.** Manual fire alarm boxes are allowed to be locked in areas occupied by detainees, provided that staff members are present within the subject area and have keys readily available to operate the manual fire alarm boxes.

**907.2.6.3.3 Automatic smoke detection system.** An automatic smoke detection system shall be installed throughout resident housing areas, including *sleeping units* and contiguous day rooms, group activity spaces and other common spaces normally open to residents.

**Exceptions:**

1. Other *approved* smoke detection arrangements providing equivalent protection, including, but not limited to, placing detectors in exhaust ducts from cells or behind protective guards *listed* for the purpose, are allowed where necessary to prevent damage or tampering.
2. *Sleeping units* in Use Conditions 2 and 3 as described in Section 308 of the (~~*International*~~) *Seattle Building Code*.
3. Smoke detectors are not required in *sleeping units* with four or fewer occupants in *smoke compartments* that are equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1.

**[W] 907.2.6.4 Group I-4 occupancies.** A manual fire alarm system that initiates the occupant notification signal utilizing an emergency voice/alarm communication system meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall be installed in Group I-4 occupancies. When automatic sprinkler systems or smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system.

**Exceptions:**

1. A manual fire alarm system is not required in Group I-4 occupancies with an occupant load of 50 or less.
2. Emergency voice alarm communication systems meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall not be required in Group I-4 occupancies with occupant loads of 100 or less, provided that activation of the manual fire alarm system initiates an *approved* occupant notification signal in accordance with Section 907.5.

**907.2.7 Group M.** A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group M occupancies where one of the following conditions exists:

1. The combined Group M *occupant load* of all floors is 500 or more persons.
2. The Group M *occupant load* is more than 100 persons above or below the lowest *level of exit discharge*.

**Exceptions:**

1. A manual fire alarm system is not required in covered or open mall buildings complying with Section 402 of the *International Building Code*.
2. Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will automatically activate throughout the notification zones upon sprinkler water flow.

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~~[S] ((907.2.7.1 Occupant notification. During times that the building is occupied, the initiation of a signal from a manual fire alarm box or from a waterflow switch shall not be required to activate the alarm notification appliances when an alarm signal is activated at a constantly attended location from which evacuation instructions shall be initiated over an emergency voice/alarm communication system installed in accordance with Section 907.5.2.2.))~~

**907.2.8 Group R-1.** Fire alarm systems and smoke alarms shall be installed in Group R-1 occupancies as required in Sections 907.2.8.1 through 907.2.8.3.

**907.2.8.1 Manual fire alarm system.** A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-1 occupancies.

### Exceptions:

1. A manual fire alarm system is not required in buildings not more than two stories in height where all individual *sleeping units* and contiguous attic and crawl spaces to those units are separated from each other and public or common areas by not less than 1-hour *fire partitions* and each individual *sleeping unit* has an *exit* directly to a *public way*, *egress court* or yard.
2. Manual fire alarm boxes are not required throughout the building where all of the following conditions are met:
  - 2.1. The building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
  - 2.2. The notification appliances will activate upon sprinkler water flow.
  - 2.3. Not fewer than one manual fire alarm box is installed at an *approved* location.

**[S] 907.2.8.2 Automatic ((smoke)) detection system.** An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed throughout all interior *corridors* serving *sleeping units*. Automatic heat detectors shall be provided in any non-sprinklered interior areas outside guestrooms other than attics and crawl spaces.

**Exception:** An automatic ((smoke)) detection system is not required in buildings that do not have interior *corridors* serving *sleeping units* and where each *sleeping unit* has a *means of egress* door opening directly to an *exit* or to an exterior *exit access* that leads directly to an *exit*.

### **907.2.8.2 Point of Information**

Smoke detectors may be required throughout corridors in accordance with Seattle Mechanical Code Section 606.2, depending on design details of the mechanical systems.

**907.2.8.3 Smoke alarms.** Single- and multiple-station smoke alarms shall be installed in accordance with Section 907.2.11.

**907.2.9 Group R-2.** Fire alarm systems and smoke alarms shall be installed in Group R-2 occupancies as required in Sections 907.2.9.1 and 907.2.9.3.

**[S] 907.2.9.1 Manual fire alarm system.** A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-2 occupancies where any of the following conditions apply:

1. Any *dwelling unit* or *sleeping unit* is located three or more stories above the lowest *level of exit discharge*.
2. Any *dwelling unit* or *sleeping unit* is located more than one story below the highest *level of exit discharge* of *exits* serving the *dwelling unit* or *sleeping unit*.
3. The building contains more than 16 *dwelling units* or *sleeping units*.

### Exceptions:

1. A fire alarm system is not required in buildings not more than two stories in height where all *dwelling units* or *sleeping units* and contiguous attic and crawl spaces are separated from each other and public or common areas by not less than 1-hour *fire partitions* and each *dwelling unit* or *sleeping unit* has an *exit* directly to a *public way*, *egress court* or yard.
2. Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2 and the occupant notification appliances will automatically activate throughout the notification zones upon a sprinkler water flow.
3. A fire alarm system is not required in buildings that do not have interior *corridors* serving *dwelling units* and are protected by an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, provided that *dwelling units* either have a *means of egress* door opening directly to an exterior *exit access* that leads directly to the *exits* or are served by open-ended *corridors* designed in accordance with Section 1027.6, Exception 3.

4. A fire alarm system is not required for townhouses where each townhouse unit is provided with a dedicated sprinkler system or approved by the fire code official.
5. In boarding homes licensed by the State of Washington, manual fire alarm boxes in resident sleeping areas are not required at exits if located at all constantly attended staff locations, if such staff locations are visible, continuously accessible, located on each floor, and positioned so no portion of the story exceeds a horizontal travel distance of 200 feet (60 960 mm) to a manual fire alarm box.

**907.2.9.2 Smoke alarms.** Single- and multiple-station smoke alarms shall be installed in accordance with Section 907.2.11.

**907.2.9.3 Group R-2 college and university buildings.** An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-2 occupancies operated by a college or university for student or staff housing in all of the following locations:

1. Common spaces outside of *dwelling units* and *sleeping units*.
2. Laundry rooms, mechanical equipment rooms and storage rooms.
3. All interior *corridors* serving *sleeping units* or *dwelling units*.

**Exception:** An automatic smoke detection system is not required in buildings that do not have interior *corridors* serving *sleeping units* or *dwelling units* and where each *sleeping unit* or *dwelling unit* either has a *means of egress* door opening directly to an exterior *exit access* that leads directly to an *exit* or a *means of egress* door opening directly to an *exit*.

Required smoke alarms in *dwelling units* and *sleeping units* in Group R-2 occupancies operated by a college or university for student or staff housing shall be interconnected with the fire alarm system in accordance with NFPA 72.

**[S] 907.2.10 Group S.** A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group S public- and self-storage occupancies three stories or greater in height for interior *corridors* and interior common areas. Visible notification appliances are not required within storage units. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group S occupancies where the combined area of all Group S fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).

**Exception:** Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

**907.2.11 Single- and multiple-station smoke alarms.** Listed single- and multiple-station smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.7 and NFPA 72.

**[W] 907.2.11.1 Group R-1.** Single- or multiple-station smoke alarms shall be installed in all of the following locations in Group R-1:

1. In sleeping areas.
2. In each loft constructed in accordance with Section 420.14 of the *International Building Code*.
- ~~(2)~~ 3. In every room in the path of the *means of egress* from the sleeping area to the door leading from the *sleeping unit*.
- ~~(3)~~ 4. In each story within the *sleeping unit*, including *basements*. For *sleeping units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

**[W] 907.2.11.2 Groups R-2, R-3, R-4 and I-1.** Single- or multiple-station smoke alarms shall be installed and maintained in Groups R-2, R-3, R-4 and I-1 regardless of *occupant load* at all of the following locations:

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bedrooms.
2. In each room used for sleeping purposes.
3. In each loft constructed in accordance with Section 420.14 of the *International Building Code*.
- ~~(3)~~ 4. In each story within a *dwelling unit*, including *basements* but not including crawl spaces and uninhabitable attics. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

**907.2.11.3 Installation near cooking appliances.** Smoke alarms shall not be installed in the following locations unless this would prevent placement of a smoke alarm in a location required by Section 907.2.11.1 or 907.2.11.2:

1. Ionization smoke alarms shall not be installed less than 20 feet (6096 mm) horizontally from a permanently installed cooking appliance.



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2. Ionization smoke alarms with an alarm-silencing switch shall not be installed less than 10 feet (3048 mm) horizontally from a permanently installed cooking appliance.
3. Photoelectric smoke alarms shall not be installed less than 6 feet (1829 mm) horizontally from a permanently installed cooking appliance.

**907.2.11.4 Installation near bathrooms.** Smoke alarms shall be installed not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by Section 907.2.11.1 or 907.2.11.2.

**907.2.11.5 Interconnection.** Where more than one smoke alarm is required to be installed within an individual *dwelling unit* or *sleeping unit* in Group R or I-1 occupancies, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate all of the alarms in the individual unit. Physical interconnection of smoke alarms shall not be required where *listed* wireless alarms are installed and all alarms sound upon activation of one alarm. The alarm shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed.

**[S] 907.2.11.6 Power source.** In new construction, required smoke alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery back-up shall be connected to an emergency ((~~electrical~~)) system in accordance with Section 1203. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

**Exception:** Smoke alarms are not required to be equipped with battery backup where they are connected to an emergency ((~~electrical~~)) system that complies with Section ((~~603~~)) 1203.

**907.2.11.7 Smoke detection system.** Smoke detectors *listed* in accordance with UL 268 and provided as part of the building fire alarm system shall be an acceptable alternative to single- and multiple-station *smoke alarms* and shall comply with the following:

1. The fire alarm system shall comply with all applicable requirements in Section 907.
2. Activation of a smoke detector in a *dwelling unit* or *sleeping unit* shall initiate alarm notification in the *dwelling unit* or *sleeping unit* in accordance with Section 907.5.2.
3. Activation of a smoke detector in a *dwelling unit* or *sleeping unit* shall not activate alarm notification appliances outside of the *dwelling unit* or *sleeping unit*, provided that a supervisory signal is generated and monitored in accordance with Section 907.6.6.

**[S] 907.2.12 Special amusement buildings.** ((~~Am~~)) When required by the fire code official, an automatic smoke detection system shall be provided in special amusement buildings in accordance with Sections 907.2.12.1 through 907.2.12.3.

**907.2.12.1 Alarm.** Activation of any single smoke detector, the *automatic sprinkler system* or any other automatic fire detection device shall immediately activate an audible and visible alarm at the building at a constantly attended location from which emergency action can be initiated, including the capability of manual initiation of requirements in Section 907.2.12.2.

**907.2.12.2 System response.** The activation of two or more smoke detectors, a single smoke detector equipped with an alarm verification feature, the *automatic sprinkler system* or other *approved* fire detection device shall automatically do all of the following:

1. Cause illumination of the *means of egress* with light of not less than 1 footcandle (11 lux) at the walking surface level.
2. Stop any conflicting or confusing sounds and visual distractions.
3. Activate an *approved* directional *exit* marking that will become apparent in an emergency.
4. Activate a prerecorded message, audible throughout the special amusement building, instructing patrons to proceed to the nearest *exit*. Alarm signals used in conjunction with the prerecorded message shall produce a sound that is distinctive from other sounds used during normal operation.

**907.2.12.3 Emergency voice/alarm communication system.** An emergency voice/alarm communication system, which is allowed to serve as a public address system, shall be installed in accordance with Section 907.5.2.2 and be audible throughout the entire special amusement building.

**[S] 907.2.13 High-rise buildings.** High-rise buildings shall be provided with an automatic smoke detection system in accordance with Section 907.2.13.1, a fire department communication system in accordance with Section 907.2.13.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.

### Exceptions:

1. Airport traffic control towers in accordance with Section 907.2.22 of this code and Section 412 of the *International Building Code*.

2. Open parking garages in accordance with Section 406.5 of the *International Building Code*.
3. Buildings with an occupancy in Group A-5 in accordance with Section 303.1 of the *International Building Code*.
4. Low-hazard special occupancies in accordance with Section 503.1.1 of the *International Building Code*.
- ~~(5. Buildings with an occupancy in Group H-1, H-2 or H-3 in accordance with Section 415 of the *International Building Code*.~~
- 6) 5. In Group I-1 and I-2 occupancies, the alarm shall sound at a constantly attended location and occupant notification shall be broadcast by the emergency voice/alarm communication system.

**907.2.13.1 Automatic smoke detection.** Automatic smoke detection in high-rise buildings shall be in accordance with Sections 907.2.13.1.1 and 907.2.13.1.2.

**907.2.13.1.1 Area smoke detection.** Area smoke detectors shall be provided in accordance with this section. Smoke detectors shall be connected to an automatic fire alarm system. The activation of any detector required by this section shall activate the emergency voice/alarm communication system in accordance with Section 907.5.2.2. In addition to smoke detectors required by Sections 907.2.1 through 907.2.9, smoke detectors shall be located as follows:

1. In each mechanical equipment, electrical, transformer, telephone equipment or similar room that is not provided with sprinkler protection.
2. In each elevator machine room, machinery space, control room and control space and in elevator lobbies.

**907.2.13.1.2 Duct smoke detection.** Duct smoke detectors complying with Section 907.3.1 shall be located as follows:

1. In the main return air and exhaust air plenum of each air-conditioning system having a capacity greater than 2,000 cubic feet per minute (cfm) (0.94 m<sup>3</sup>/s). Such detectors shall be located in a serviceable area downstream of the last duct inlet.
2. At each connection to a vertical duct or riser serving two or more stories from a return air duct or plenum of an air-conditioning system. In Group R-1 and R-2 occupancies, a smoke detector is allowed to be used in each return air riser carrying not more than 5,000 cfm (2.4 m<sup>3</sup>/s) and serving not more than 10 air-inlet openings.

**[S] 907.2.13.2 Fire department communication system.** Where a wired communication system is *approved* in lieu of an in-building, two-way emergency responder communication coverage system in accordance with Section 510, the wired fire department communication system shall be designed and installed in accordance with NFPA 72 and shall operate between a *fire command center* complying with Section 508, elevators, elevator lobbies, emergency and standby power rooms, fire pump rooms, areas of refuge and inside *interior exit stairways*. The fire department communication device shall be provided at each floor level within the *interior exit stairway*. Eight portable handsets for the communication system shall be provided in the fire command center.

**907.2.13.3 Multiple-channel voice evacuation.** In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, voice evacuation systems for high-rise buildings shall be multiple-channel systems.

**907.2.14 Atriums connecting more than two stories.** A fire alarm system shall be installed in occupancies with an atrium that connects more than two stories, with smoke detection in locations required by a rational analysis in Section 909.4 and in accordance with the system operation requirements in Section 909.17. The system shall be activated in accordance with Section 907.5. Such occupancies in Group A, E or M shall be provided with an emergency voice/alarm communication system complying with the requirements of Section 907.5.2.2.

**[S] 907.2.15 High-piled combustible storage areas.** An automatic (~~smoke~~) fire detection system shall be installed throughout *high-piled combustible storage areas* where required by Section 3206.5.

**907.2.16 Aerosol storage uses.** Aerosol product rooms and general-purpose warehouses containing aerosol products shall be provided with an *approved* manual fire alarm system where required by this code.

**907.2.17 Lumber, wood structural panel and veneer mills.** Lumber, wood structural panel and veneer mills shall be provided with a manual fire alarm system.

**907.2.18 Underground buildings with smoke control systems.** Where a smoke control system is installed in an underground building in accordance with the *International Building Code*, automatic smoke detectors shall be provided in accordance with Section 907.2.18.1.

**907.2.18.1 Smoke detectors.** Not fewer than one smoke detector *listed* for the intended purpose shall be installed in all of the following areas:

1. Mechanical equipment, electrical, transformer, telephone equipment, elevator machine or similar rooms.
2. Elevator lobbies.

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3. The main return and exhaust air plenum of each air-conditioning system serving more than one story and located in a serviceable area downstream of the last duct inlet.
4. Each connection to a vertical duct or riser serving two or more floors from return air ducts or plenums of heating, ventilating and air-conditioning systems, except that in Group R occupancies, a *listed* smoke detector is allowed to be used in each return air riser carrying not more than 5,000 cfm (2.4 m<sup>3</sup>/s) and serving not more than 10 air inlet openings.

**907.2.18.2 Alarm required.** Activation of the smoke control system shall activate an audible alarm at a constantly attended location.

**907.2.19 Deep underground buildings.** Where the lowest level of a structure is more than 60 feet (18 288 mm) below the finished floor of the lowest *level of exit discharge*, the structure shall be equipped throughout with a manual fire alarm system, including an emergency voice/alarm communication system installed in accordance with Section 907.5.2.2.

**907.2.20 Covered and open mall buildings.** Where the total floor area exceeds 50,000 square feet (4645 m<sup>2</sup>) within either a covered mall building or within the perimeter line of an open mall building, an emergency voice/alarm communication system shall be provided. *Access* to emergency voice/alarm communication systems serving a mall, required or otherwise, shall be provided for the fire department. The system shall be provided in accordance with Section 907.5.2.2.

**907.2.21 Residential aircraft hangars.** Not fewer than one single-station smoke alarm shall be installed within a residential aircraft hangar as defined in Chapter 2 of the *International Building Code* and shall be interconnected into the residential smoke alarm or other sounding device to provide an alarm that will be audible in all sleeping areas of the *dwelling*.

**907.2.22 Airport traffic control towers.** An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be provided in airport control towers in accordance with Sections 907.2.22.1 and 907.2.22.2.

**Exception:** Audible appliances shall not be installed within the control tower cab.

**907.2.22.1 Airport traffic control towers with multiple exits and automatic sprinklers.** Airport traffic control towers with multiple *exits* and equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 shall be provided with smoke detectors in all of the following locations:

1. Airport traffic control cab.
2. Electrical and mechanical equipment rooms.
3. Airport terminal radar and electronics rooms.
4. Outside each opening into *interior exit stairways*.
5. Along the single *means of egress* permitted from observation levels.
6. Outside each opening into the single *means of egress* permitted from observation levels.

**907.2.22.2 Other airport traffic control towers.** Airport traffic control towers with a single *exit* or where sprinklers are not installed throughout shall be provided with smoke detectors in all of the following locations:

1. Airport traffic control cab.
2. Electrical and mechanical equipment rooms.
3. Airport terminal radar and electronics rooms.
4. Office spaces incidental to the tower operation.
5. Lounges for employees, including sanitary facilities.
6. *Means of egress*.
7. Utility shafts where *access* to smoke detectors can be provided.

**907.2.23 Energy storage systems.** An automatic smoke detection system or radiant-energy detection system shall be installed in rooms, areas and walk-in units containing energy storage systems as required in Section 1207.5.4.

**907.3 Fire safety functions.** Automatic fire detectors utilized for the purpose of performing fire safety functions shall be connected to the building's fire alarm control unit where a fire alarm system is required by Section 907.2. Detectors shall, upon actuation, perform the intended function and activate the alarm notification appliances or activate a visible and audible supervisory signal at a constantly attended location. In buildings not equipped with a fire alarm system, the automatic fire detector shall be powered by normal electrical service and, upon actuation, perform the intended function. The detectors shall be located in accordance with NFPA 72.

**[S] 907.3.1 Duct smoke detectors.** Smoke detectors installed in ducts shall be *listed* for the air velocity, temperature and humidity present in the duct. Duct smoke detectors shall be connected to the building's fire alarm control unit where a fire alarm system is required by Section 907.2. Activation of a duct smoke detector shall (~~initiate a visible and audible supervi-~~

sory signal at a ~~constantly attended location and shall~~) perform the intended fire safety function in accordance with this code and the *International Mechanical Code*. In facilities that are required to be monitored by a supervising station, duct smoke detectors shall report only as a supervisory signal and not as a fire alarm. They shall not be used as a substitute for required open area detection and shall not activate the occupant notification system.

**(Exceptions:**

1. ~~The supervisory signal at a constantly attended location is not required where duct smoke detectors activate the building's alarm notification appliances.~~
- 2-) **Exception:** In occupancies not required to be equipped with a fire alarm system, actuation of a smoke detector shall activate a visible and an audible signal in an *approved* location. Smoke detector trouble conditions shall activate a visible or audible signal in an *approved* location and shall be identified as air duct detector trouble.

**907.3.2 Special locking systems.** Where special locking systems are installed on *means of egress* doors in accordance with Section 1010.2.14 or 1010.2.13, an automatic detection system shall be installed as required by that section.

**[S] 907.3.3 Elevator emergency operation.** Automatic fire detectors installed for elevator emergency operation shall be installed in accordance with the provisions of ~~((ASME A17.1/CSA B44 and NFPA 72))~~ Administrative Rule 9.06.14, Sprinkler Systems and Fire Alarms for Elevator Machinery Rooms, Hoist Ways and Pits, and any future revisions of this rule adopted by the fire code official.

**907.3.4 Wiring.** The wiring to the auxiliary devices and equipment used to accomplish the fire safety functions shall be monitored for integrity in accordance with NFPA 72.

**907.4 Initiating devices.** Where a fire alarm system is required by another section of this code, occupant notification in accordance with Section 907.5 shall be initiated by one or more of the following. Initiating devices shall be installed in accordance with Sections 907.4.1 through 907.4.3.1.

1. Manual fire alarm boxes.
2. Automatic fire detectors.
3. *Automatic sprinkler system* waterflow devices.
4. Automatic fire-extinguishing systems.

**907.4.1 Protection of fire alarm control unit.** In areas that are not continuously occupied, a single smoke detector shall be provided at the location of each fire alarm control unit, notification appliance circuit power extenders and supervising station transmitting equipment.

**Exception:** Where ambient conditions prohibit installation of a smoke detector, a *heat detector* shall be permitted.

**907.4.2 Manual fire alarm boxes.** Where a manual fire alarm system is required by another section of this code, it shall be activated by fire alarm boxes installed in accordance with Sections 907.4.2.1 through 907.4.2.6.

**907.4.2.1 Location.** Manual fire alarm boxes shall be located not more than 5 feet (1524 mm) from the entrance to each *exit*. In buildings not protected by an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2, additional manual fire alarm boxes shall be located so that the distance of travel to the nearest box does not exceed 200 feet (60 960 mm).

**907.4.2.2 Height.** The height of the manual fire alarm boxes shall be not less than 42 inches (1067 mm) and not more than 48 inches (1372 mm) measured vertically, from the floor level to the activating handle or lever of the box.

**907.4.2.3 Color.** Manual fire alarm boxes shall be red in color.

**907.4.2.4 Signs.** Where fire alarm systems are not monitored by an *approved* supervising station in accordance with Section 907.6.6, an *approved* permanent sign shall be installed adjacent to each manual fire alarm box that reads: "WHEN ALARM SOUNDS—CALL FIRE DEPARTMENT."

**Exception:** Where the manufacturer has permanently provided this information on the manual fire alarm box.

**907.4.2.5 Protective covers.** The *fire code official* is authorized to require the installation of *listed* manual fire alarm box protective covers to prevent malicious false alarms or to provide the manual fire alarm box with protection from physical damage. The protective cover shall be transparent or red in color with a transparent face to permit visibility of the manual fire alarm box. Each cover shall include proper operating instructions. A protective cover that emits a local alarm signal shall not be installed unless *approved*. Protective covers shall not project more than that permitted by Section 1003.3.3.

**907.4.2.6 Unobstructed and unobscured.** Manual fire alarm boxes shall be provided with *ready access*, unobstructed, unobscured and visible at all times.

**907.4.3 Automatic smoke detection.** Where an automatic smoke detection system is required, it shall utilize smoke detectors unless ambient conditions prohibit such an installation. In spaces where smoke detectors cannot be utilized due to ambient conditions, *approved* automatic *heat detectors* shall be permitted.

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**907.4.3.1 Automatic sprinkler system.** For conditions other than specific fire safety functions noted in Section 907.3, in areas where ambient conditions prohibit the installation of smoke detectors, an *automatic sprinkler system* installed in such areas in accordance with Section 903.3.1.1 or 903.3.1.2 and that is connected to the fire alarm system shall be *approved* as automatic heat detection.

**907.5 Occupant notification.** Occupant notification by fire alarms shall be in accordance with Sections 907.5.1 through 907.5.2.3.3. Occupant notification by smoke alarms in Group R-1 and R-2 occupancies shall comply with Section 907.5.2.1.3.2.

**907.5.1 Alarm activation and annunciation.** Upon activation, fire alarm systems shall initiate occupant notification and shall annunciate at the fire alarm control unit, or where allowed elsewhere by Section 907, at a *constantly attended location*.

**907.5.1.1 Presignal feature.** A presignal feature shall only be provided where *approved*. The presignal shall be annunciated at an *approved, constantly attended location*, having the capability to activate the occupant notification system in the event of fire or other emergency.

**907.5.2 Alarm notification appliances.** Alarm notification appliances shall be provided and shall be *listed* for their purpose.

[S] **907.5.2.1 Audible alarms.** Audible alarm notification appliances shall be provided and emit a distinctive sound that is not to be used for any purpose other than that of a fire alarm.

### Exceptions:

1. Audible alarm notification appliances are not required in critical care areas of Group I-2, Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
2. A visible alarm notification appliance installed in a nurses' control station or other continuously attended staff location in a Group I-2, Condition 2 suite shall be an acceptable alternative to the installation of audible alarm notification appliances throughout a suite or unit in Group I-2, Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
3. Where provided, audible notification appliances located in each enclosed occupant evacuation elevator lobby in accordance with Section ~~((3008.9.1))~~ 403.6.2.10.1 of the *International Building Code* shall be connected to a separate notification zone for manual paging only.

**907.5.2.1.1 Average sound pressure.** The audible alarm notification appliances shall provide a sound pressure level of 15 decibels (dBA) above the average ambient sound level or 5 dBA above the maximum sound level having a duration of not less than 60 seconds, whichever is greater, in every occupiable space within the building. The minimum sound pressure levels shall be 75 dBA in occupancies in Group R and I-condition 1, 90 dBA in mechanical equipment rooms, and 60 dBA in other occupancies.

### Exceptions:

1. Private mode signaling in accordance with NFPA 72 is allowed in areas of Group I-2 and I -3 occupancies if occupants are not expected to self evacuate.
2. Alarm systems installed in selected parts of a building are required to meet sound pressure requirements within the selected area of the building only.

[W] **907.5.2.1.2 Maximum sound pressure.** The ~~((total))~~ maximum sound pressure level ~~((produced by combining the ambient sound pressure level with all))~~ for audible notification appliances ~~((operating))~~ shall ~~((not exceed))~~ be 110 dBA at the minimum hearing distance from the audible appliance. For systems operating in public mode, the maximum sound pressure level shall not exceed 30 dBA over the average ambient sound level. Where the average ambient noise is greater than ~~((405))~~ 95 dBA, visible alarm notification appliances shall be provided in accordance with NFPA 72 and audible alarm notification appliances shall not be required.

**907.5.2.1.3 Audible signal frequency in Group R-1 and R-2 sleeping rooms.** Audible signal frequency in Group R-1 and R-2 occupancies shall be in accordance with Sections 907.5.2.1.3.1 and 907.5.2.1.3.2.

**907.5.2.1.3.1 Fire alarm system signal.** In sleeping rooms of Group R-1 and R-2 occupancies, the audible alarm activated by a fire alarm system shall be a 520-Hz low-frequency signal complying with NFPA 72.

**907.5.2.1.3.2 Smoke alarm signal in sleeping rooms.** In sleeping rooms of Group R-1 and R-2 occupancies that are required by Section 907.2.8 or 907.2.9 to have a fire alarm system, the audible alarm signal activated by single- or multiple-station smoke alarms in the *dwelling unit* or *sleeping unit* shall be a 520-Hz signal complying NFPA 72.

Where a sleeping room smoke alarm is unable to produce a 520-Hz signal, the 520-Hz alarm signal shall be provided by a *listed* notification appliance or a smoke detector with an integral 520-Hz sounder.

[S] **907.5.2.2 Emergency voice/alarm communication systems.** Emergency voice/alarm communication systems required by this code shall be designed and installed in accordance with NFPA 72. The operation of any automatic fire

detector, sprinkler waterflow device or manual fire alarm box shall automatically sound an alert tone followed by voice instructions giving *approved* information and directions for a general or staged evacuation in accordance with the building's fire safety and evacuation plans required by Section 404. In high-rise buildings, the system shall operate on at least the alarming floor, the floor above and ~~((the floor))~~ two floors below. Speakers shall be provided throughout the building by paging zones. At a minimum, paging zones shall be provided as follows:

1. Elevator groups.
2. *Interior exit stairways*.
3. Each floor.
4. *Areas of refuge* as defined in Chapter 2.

**Exception:** In Group I-1 and I-2 occupancies, the alarm shall sound in a constantly attended area and a general occupant notification shall be broadcast over the overhead page.

**907.5.2.2.1 Manual override.** A manual override for emergency voice communication shall be provided on a selective and all-call basis for all paging zones.

**907.5.2.2.2 Live voice messages.** The emergency voice/alarm communication system shall have the capability to broadcast live voice messages by paging zones on a selective and all-call basis.

**907.5.2.2.3 Alternative uses.** The emergency voice/alarm communication system shall be allowed to be used for other announcements, provided that the manual fire alarm use takes precedence over any other use.

**907.5.2.2.4 Emergency voice/alarm communication captions.** Where stadiums, arenas and *grandstands* have 15,000 fixed seats or more and provide audible public announcements, the emergency/voice alarm communication system shall provide prerecorded or real-time captions. Prerecorded or live emergency captions shall be from an *approved* location constantly attended by personnel trained to respond to an emergency.

**907.5.2.2.5 Standby power.** Emergency voice/alarm communications systems shall be provided with *legally required* standby power in accordance with Section 1203.

**907.5.2.2.6 Voice intelligibility.** Voice intelligibility is required in acoustically distinguished spaces, such as interior dwelling and sleeping units. Voice intelligibility is not required in acoustically distinguished spaces that meet the following conditions:

1. The alert tone within such spaces provides audible levels meeting the requirements of Section 907.5.2.1.1.
2. Such spaces are within 30 feet (9144 mm) travel distance to a space that does meet voice intelligibility requirements.

[S] **907.5.2.3 Visible alarms.** Visible alarm notification appliances shall be provided in accordance with Sections 907.5.2.3.1 through 907.5.2.3.3, and Administrative Rule 9.09.18, *Visible Alarm Notification Devices*, and any future revisions of this rule adopted by the *fire code official*.

**Exceptions:**

1. Visible alarm notification appliances are not required in *alterations*, except where an existing fire alarm system is upgraded or replaced, or a new fire alarm system is installed.
2. Visible alarm notification appliances shall not be required in *exits* as defined in Chapter 2.
3. Visible alarm notification appliances shall not be required in elevator cars.
4. Visual alarm notification appliances are not required in critical care areas of Group I-2, Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
5. A visible alarm notification appliance installed in a nurses' control station or other continuously attended staff location in a Group I-2, Condition 2 suite shall be an acceptable alternative to the installation of visible alarm notification appliances throughout the suite or unit in Group I-2, Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
6. Alarm systems installed in selected parts of a building are required to meet sound pressure requirements within the selected area of the building only.

**907.5.2.3.1 Public use areas and common use areas.** Visible alarm notification appliances shall be provided in *public use areas* and *common use areas*.

**Exception:** Where employee work areas have audible alarm coverage, the notification appliance circuits serving the employee work areas shall be initially designed with not less than 20-percent spare capacity to account for the potential of adding visible notification appliances in the future to accommodate hearing-impaired employee(s).

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**907.5.2.3.2 Groups I-1 and R-1.** *Habitable spaces in dwelling units and sleeping units* in Group I-1 and R-1 occupancies in accordance with Table 907.5.2.3.2 shall be provided with visible alarm notification. Visible alarms shall be activated by the in-room smoke alarm and the building fire alarm system.

**TABLE 907.5.2.3.2  
VISIBLE ALARMS**

NUMBER OF SLEEPING UNITS	SLEEPING ACCOMMODATIONS WITH VISIBLE ALARMS
6 to 25	2
26 to 50	4
51 to 75	7
76 to 100	9
101 to 150	12
151 to 200	14
201 to 300	17
301 to 400	20
401 to 500	22
501 to 1,000	5% of total
1,001 and over	50 plus 3 for each 100 over 1,000

**907.5.2.3.3 Group R-2.** In Group R-2 occupancies required by Section 907 to have a fire alarm system, each *story* that contains *dwelling units* and *sleeping units* shall be provided with the capability to support future visible alarm notification appliances in accordance with Chapter 11 of ICC A117.1. Such capability shall accommodate wired or wireless equipment.

**907.5.2.3.3.1 Wired equipment.** Where wired equipment is used to comply with the future capability required by Section 907.5.2.3.3, the system shall include one of the following capabilities:

1. The replacement of audible appliances with combination audible/visible appliances or additional visible notification appliances.
2. The future extension of the existing wiring from the unit smoke alarm locations to required locations for visible appliances.
3. For wired equipment, the fire alarm power supply and circuits shall have not less than 5-percent excess capacity to accommodate the future addition of visible alarm notification appliances, and a single access point to such circuits shall be available on every story. Such circuits shall not be required to be extended beyond a single access point on a story. The fire alarm system shop drawings required by Section 907.1.2 shall include the power supply and circuit documentation to accommodate the future addition of visible notification appliances.

**907.6 Installation and monitoring.** A fire alarm system shall be installed and monitored in accordance with Sections 907.6.1 through 907.6.6.3 and NFPA 72.

**[S] 907.6.1 Wiring.** Wiring shall comply with the requirements of (~~NFPA 70~~) the Seattle Electrical Code and NFPA 72. Wireless protection systems utilizing radio-frequency transmitting devices shall comply with the special requirements for supervision of low-power wireless systems in NFPA 72.

**907.6.2 Power supply.** The primary and secondary power supply for the fire alarm system shall be provided in accordance with NFPA 72.

**Exception:** Backup power for single-station and multiple-station smoke alarms as required in Section 907.2.11.6.

**907.6.3 Initiating device identification.** The fire alarm system shall identify the specific initiating device address, location, device type, floor level where applicable and status including indication of normal, alarm, trouble and supervisory status, as appropriate.

**Exceptions:**

1. Fire alarm systems in single-story buildings less than 22,500 square feet (2090 m<sup>2</sup>) in area.
2. Fire alarm systems that only include manual fire alarm boxes, waterflow initiating devices and not more than 10 additional alarm-initiating devices.
3. Special initiating devices that do not support individual device identification.
4. Fire alarm systems or devices that are replacing existing equipment.

**907.6.3.1 Annunciation.** The initiating device status shall be annunciated at an *approved* on-site location.

**907.6.4 Zones.** Each floor shall be zoned separately and a zone shall not exceed 22,500 square feet (2090 m<sup>2</sup>). The length of any zone shall not exceed 300 feet (91 440 mm) in any direction.

**Exception:** *Automatic sprinkler system* zones shall not exceed the area permitted by NFPA 13.

**[S] 907.6.4.1 ((Zoning indicator)) Annunciator panel.** ~~((A zoning indicator panel and the associated controls shall be provided in an approved location.))~~ All fire alarm systems in buildings without a fire command center shall be provided with an annunciator panel (or the main fire alarm control panel) located inside the building at the main building entrance. The visual zone indication shall lock in until the system is reset and shall not be canceled by the operation of an audible alarm-silencing switch.

**[S] 907.6.4.2 High-rise buildings.** In high-rise buildings, a separate zone by floor shall be provided for each of the following types of alarm-initiating devices where provided:

1. Smoke detectors.
2. Sprinkler waterflow devices.
3. Manual fire alarm boxes other than the manual fire alarm box located in the fire command center.
4. Other *approved* types of automatic *fire protection systems*.

**907.6.5 Access.** Access shall be provided to each fire alarm device and notification appliance for periodic inspection, maintenance and testing.

**[S] 907.6.6 Monitoring.** Fire alarm systems required by this chapter or by the *International Building Code* shall be monitored by an *approved* supervising station in accordance with NFPA 72.

**Exception:** Monitoring by a supervising station is not required for:

1. Single- and multiple-station smoke alarms required by Section 907.2.11.
2. Smoke detectors in Group I-3 occupancies.
3. *Automatic sprinkler systems* in one- and two-family *dwelling*s and townhouses where each townhouse unit is provided with a dedicated sprinkler system.

**907.6.6.1 Transmission of alarm signals.** Transmission of alarm signals to a supervising station shall be in accordance with NFPA 72.

**907.6.6.2 MIY monitoring.** Direct transmission of alarms associated with monitor it yourself (MIY) transmitters to a public safety answering point (PSAP) shall not be permitted unless *approved* by the *fire code official*.

**907.6.6.3 Termination of monitoring service.** Termination of fire alarm monitoring services shall be in accordance with Section 901.9.

#### **907.6.6.3 Point of Information**

Termination of monitoring service only applies when monitoring contracts expire or are cancelled.

**[S] 907.7 Acceptance tests and completion.** Upon completion of the installation or portion thereof, and after the electrical inspector has *approved* the installation or portion thereof, the fire alarm system and all fire alarm components or portion thereof shall be tested in accordance with NFPA 72.

**907.7.1 Single- and multiple-station alarm devices.** When the installation of the alarm devices is complete, each device and interconnecting wiring for multiple-station alarm devices shall be tested in accordance with the smoke alarm provisions of NFPA 72.

**907.7.2 Record of completion.** A record of completion in accordance with NFPA 72 verifying that the system or portion thereof has been installed and tested in accordance with the *approved* plans and specifications shall be provided.

**907.7.3 Instructions.** Operating, testing and maintenance instructions and record drawings (“as built”) and equipment specifications shall be provided at an *approved* location.

**907.8 Inspection, testing and maintenance.** The maintenance and testing schedules and procedures for fire alarm and fire detection systems shall be in accordance with Sections 907.8.1 through 907.8.4 and NFPA 72. Records of inspection, testing and maintenance shall be maintained.

**907.8.1 Maintenance required.** Where required for compliance with the provisions of this code, devices, equipment, systems, conditions, arrangements, levels of protection or other features shall thereafter be continuously maintained in accordance with applicable NFPA requirements or as directed by the *fire code official*.

**907.8.2 Testing.** Testing shall be performed in accordance with the schedules in NFPA 72 or more frequently where required by the *fire code official*. Records of testing shall be maintained.



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**Exception:** Devices or equipment that are inaccessible because of safety considerations shall be tested during scheduled shutdowns where *approved* by the *fire code official*, but not less than every 18 months.

**907.8.3 Smoke detector sensitivity.** Smoke detector sensitivity shall be checked within one year after installation and every alternate year thereafter. After the second calibration test, where sensitivity tests indicate that the detector has remained within its *listed* and marked sensitivity range (or 4-percent obscuration light gray smoke, if not marked), the length of time between calibration tests shall be permitted to be extended to not more than 5 years. Where the frequency is extended, records of detector-caused nuisance alarms and subsequent trends of these alarms shall be maintained. In zones or areas where nuisance alarms show any increase over the previous year, calibration tests shall be performed.

**907.8.4 Inspection, testing and maintenance.** The building *owner* shall be responsible to maintain the fire and *life safety systems* in an operable condition at all times. Service personnel shall meet the qualification requirements of NFPA 72 for inspection, testing and maintenance of such systems. Records of inspection, testing and maintenance shall be maintained.

**[W] 907.8.4.1 Testing/maintenance.** All inspection, testing, maintenance and programming not defined as “electrical construction trade” by chapter 19.28 RCW shall be completed by a NICET II or ESA/NTS Certified Fire Alarm Technician (CFAT) Level II Fire in fire alarms (effective July 1, 2018).

**907.9 Where required in existing buildings and structures.** An *approved* fire alarm system shall be provided in existing buildings and structures where required in Chapter 11.

**907.10 Smoke alarm maintenance.** Smoke alarms shall be tested and maintained in accordance with the manufacturer’s instructions. Smoke alarms shall be replaced when they fail to respond to operability tests, or when they exceed 10 years from the date of manufacture, unless an earlier replacement is specified in the manufacturer’s published instructions.

**[W] 907.11 NICET: National Institute for Certification in Engineering Technologies and ESA/NTS: Electronic Security Association National Training School.**

**[W] 907.11.1 Scope.** This section shall apply to new and existing fire alarm systems.

**[W] 907.11.2 Design review.** All construction documents shall be reviewed by a NICET III, or an ESA/NTS Certified Fire Alarm Designer (CFAD) Level III Fire in fire alarms or a licensed professional engineer (PE) in Washington prior to being submitted for permitting. The reviewing professional shall submit a stamped, signed, and dated letter; or a verification method *approved* by the local authority having jurisdiction indicating the system has been reviewed and meets or exceeds the design requirements of the state of Washington and the local jurisdiction. (Effective July 1, 2018).

**[W] 907.11.3 Testing/maintenance.** All inspection, testing, maintenance and programing not defined as “electrical construction trade” by chapter 19.28 RCW shall be completed by a NICET II or ESA/NTS Certified Fire Technician (CFAT) Level II Fire in fire alarms. (Effective July 1, 2018.)

**[S] 907.12 Resetting fire alarm equipment.** Fire alarm equipment shall only be reset upon general alarm activation when directed by fire department personnel.

**Exception:** If *approved* by the *fire code official*.

## SECTION 908 EMERGENCY ALARM SYSTEMS

**908.1 Group H occupancies.** Emergency alarms for the detection and notification of an emergency condition in Group H occupancies shall be provided as required in Chapter 50.

**908.2 Group H-5 occupancy.** Emergency alarms for notification of an emergency condition in an HPM facility shall be provided as required in Section 2703.12.

**[S] 908.3 Fire alarm system interface.** Where an emergency alarm system is interfaced with a building’s fire alarm system, the signal produced at the fire alarm control unit shall be a supervisory signal, unless another type of signal is required by the *fire code official*.

## SECTION 909 SMOKE CONTROL SYSTEMS

**909.1 Scope and purpose.** This section applies to mechanical or passive smoke control systems where they are required for new buildings or portions thereof by provisions of the *International Building Code* or this code. The purpose of this section is to establish minimum requirements for the design, installation and acceptance testing of smoke control systems that are intended to provide a tenable environment for the evacuation or relocation of occupants. These provisions are not intended for the preservation of contents, the timely restoration of operations or for assistance in fire suppression or overhaul activities. Smoke control systems regulated by this section serve a different purpose than the smoke- and heat-removal provisions found

in Section 910. Mechanical smoke control systems shall not be considered exhaust systems under Chapter 5 of the *International Mechanical Code*.

**[S] 909.1.1 Smoke control presubmittal conference.** The applicant shall arrange a smoke control presubmittal conference at least 60 days prior to submittal of a building permit application that contains the construction documents for any architectural components of the building. The purpose of this presubmittal conference is to obtain conceptual approval of the design team approach to compliance with the smoke control provisions in this section.

**909.2 General design requirements.** Buildings, structures, or parts thereof required by the *International Building Code* or this code to have a smoke control system or systems shall have such systems designed in accordance with the applicable requirements of Section 909 and the generally accepted and well-established principles of engineering relevant to the design. The *construction documents* shall include sufficient information and detail to describe adequately the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied with sufficient information and analysis to demonstrate compliance with these provisions.

**Point of Information**

See Seattle Building Code for details of shaft pressurization requirements.

**909.3 Special inspection and test requirements.** In addition to the ordinary inspection and test requirements that buildings, structures and parts thereof are required to undergo, smoke control systems subject to the provisions of Section 909 shall undergo special inspections and tests sufficient to verify the proper commissioning of the smoke control design in its final installed condition. The design submission accompanying the *construction documents* shall clearly detail procedures and methods to be used and the items subject to such inspections and tests. Such commissioning shall be in accordance with generally accepted engineering practice and, where possible, based on published standards for the particular testing involved. The special inspections and tests required by this section shall be conducted under the same terms as in Section 1704 of the *International Building Code*.

**909.4 Analysis.** A rational analysis supporting the types of smoke control systems to be employed, the methods of their operations, the systems supporting them and the methods of construction to be utilized shall accompany the *construction documents* submission and include, but not be limited to, the items indicated in Sections 909.4.1 through 909.4.7.

**909.4.1 Stack effect.** The system shall be designed such that the maximum probable normal or reverse stack effect will not adversely interfere with the system's capabilities. In determining the maximum probable stack effect, altitude, elevation, weather history and interior temperatures shall be used.

**909.4.2 Temperature effect of fire.** Buoyancy and expansion caused by the design fire in accordance with Section 909.9 shall be analyzed. The system shall be designed such that these effects do not adversely interfere with the system's capabilities.

**909.4.3 Wind effect.** The design shall consider the adverse effects of wind. Such consideration shall be consistent with the wind-loading provisions of the *International Building Code*.

**909.4.4 Systems.** The design shall consider the effects of the heating, ventilating and air-conditioning (HVAC) systems on both smoke and fire transport. The analysis shall include all permutations of systems status. The design shall consider the effects of the fire on the heating, ventilating and air-conditioning systems.

**909.4.5 Climate.** The design shall consider the effects of low temperatures on systems, property and occupants. Air inlets and exhausts shall be located so as to prevent snow or ice blockage.

**909.4.6 Duration of operation.** All portions of active or engineered smoke control systems shall be capable of continued operation after detection of the fire event for a period of not less than either 20 minutes or 1.5 times the calculated egress time, whichever is greater.

**909.4.7 Smoke control system interaction.** The design shall consider the interaction effects of the operation of multiple smoke control systems for all design scenarios.

**909.5 Smoke barrier construction.** *Smoke barriers* required for passive smoke control and a smoke control system using the pressurization method shall comply with Section 709 of the *International Building Code*. The maximum allowable leakage area shall be the aggregate area calculated using the following leakage area ratios:

1. Walls:  $A/A_w = 0.00100$
2. Interior *exit stairways* and *ramps* and *exit passageways*:  $A/A_w = 0.00035$
3. Enclosed *exit access stairways* and *ramps* and all other shafts:  $A/A_w = 0.00150$
4. Floors and roofs:  $A/A_F = 0.00050$

where:

$A$  = Total leakage area, square feet (m<sup>2</sup>).

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$A_F$  = Unit floor or roof area of barrier, square feet (m<sup>2</sup>).

$A_w$  = Unit wall area of barrier, square feet (m<sup>2</sup>).

The leakage area ratios shown do not include openings due to gaps around doors and operable windows. The total leakage area of the *smoke barrier* shall be determined in accordance with Section 909.5.1 and tested in accordance with Section 909.5.2.

**909.5.1 Total leakage area.** Total leakage area of the barrier is the product of the *smoke barrier* gross area multiplied by the allowable leakage area ratio, plus the area of other openings such as gaps around doors and operable windows.

**[S] 909.5.2 Testing of leakage area.** Compliance with the maximum total leakage area shall be determined by achieving the minimum air pressure difference across the barrier with the system in the smoke control mode for mechanical smoke control systems utilizing the pressurization method. Compliance with the maximum total leakage area of passive smoke control systems shall be verified through methods such as door fan testing or other methods, as *approved* by the (~~fire code~~) *building official*.

**909.5.3 Opening protection.** Openings in *smoke barriers* shall be protected by automatic-closing devices actuated by the required controls for the mechanical smoke control system. Door openings shall be protected by fire door assemblies complying with Section 716 of the *International Building Code*.

### Exceptions:

1. Passive smoke control systems with automatic-closing devices actuated by spot-type smoke detectors *listed* for releasing service installed in accordance with Section 907.3.
2. Fixed openings between smoke zones that are protected utilizing the airflow method.
3. In Group I-1, Condition 2; Group I-2; and ambulatory care facilities, where a pair of opposite-swinging doors are installed across a *corridor* in accordance with Section 909.5.3.1, the doors shall not be required to be protected in accordance with Section 716 of the *International Building Code*. The doors shall be close-fitting within operational tolerances and shall not have a center mullion or undercuts in excess of 3/4-inch (19.1 mm) louvers or grilles. The doors shall have head and jamb stops and astragals or rabbets at meeting edges and, where permitted by the door manufacturer's listing, positive-latching devices are not required.
4. In Group I-2 and ambulatory care facilities, where such doors are special-purpose horizontal sliding, accordion or folding door assemblies installed in accordance with Section 1010.3.3 and are automatic closing by smoke detection in accordance with Section 716.2.6.6 of the *International Building Code*.
5. Group I-3.
6. Openings between smoke zones with clear ceiling heights of 14 feet (4267 mm) or greater and bank-down capacity of greater than 20 minutes as determined by the design fire size.

**909.5.3.1 Group I-1, Condition 2; Group I-2; and ambulatory care facilities.** In Group I-1, Condition 2; Group I-2; and *ambulatory care facilities*, where doors are installed across a *corridor*, the doors shall be automatic closing by smoke detection in accordance with Section 716.2.6.6 of the *International Building Code* and shall have a vision panel with fire-protection-rated glazing materials in fire-protection-rated frames, the area of which shall not exceed that tested.

**909.5.3.2 Ducts and air transfer openings.** Ducts and air transfer openings are required to be protected with a minimum Class II, 250°F (121°C) smoke damper complying with Section 717 of the *International Building Code*.

**909.6 Pressurization method.** The primary mechanical means of controlling smoke shall be by pressure differences across *smoke barriers*. Maintenance of a tenable environment is not required in the smoke-control zone of fire origin.

**909.6.1 Minimum pressure difference.** The pressure difference across a *smoke barrier* used to separate smoke zones shall be not less than 0.05-inch water gage (0.0124 kPa) in fully sprinklered buildings.

In buildings permitted to be other than fully sprinklered, the smoke control system shall be designed to achieve pressure differences not less than two times the maximum calculated pressure difference produced by the design fire.

**909.6.2 Maximum pressure difference.** The maximum air pressure difference across a *smoke barrier* shall be determined by required door-opening or closing forces. The actual force required to open *exit* doors when the system is in the smoke control mode shall be in accordance with Section 1010.1.3. Opening and closing forces for other doors shall be determined by standard engineering methods for the resolution of forces and reactions. The calculated force to set a side-hinged, swing-door in motion shall be determined by:

$$F = F_{dc} + K(WA\Delta P)/2(W - d) \quad \text{(Equation 9-1)}$$

where:

$A$  = Door area, square feet (m<sup>2</sup>).

$d$  = Distance from door handle to latch edge of door, feet (m).

- $F$  = Total door opening force, pounds (N).
- $F_{dc}$  = Force required to overcome closing device, pounds (N).
- $K$  = Coefficient 5.2 (1.0).
- $W$  = Door width, feet (m).
- $\Delta P$  = Design pressure difference, inches of water (Pa).

**909.6.3 Pressurized stairways and elevator hoistways.** Where *stairways* or elevator hoistways are pressurized, such pressurization systems shall comply with Section 909 as smoke control systems, in addition to the requirements of Sections 909.20 and 909.21.

[S] **909.7 Airflow design method.** Where *approved* by the (~~(fire code)~~) *building official*, smoke migration through openings fixed in a permanently open position, which are located between smoke control zones by the use of the airflow method, shall be permitted. The design airflow shall be in accordance with this section. Airflow shall be directed to limit smoke migration from the fire zone. The geometry of openings shall be considered to prevent flow reversal from turbulent effects. Smoke control systems using the airflow method shall be designed in accordance with NFPA 92.

**909.7.1 Prohibited conditions.** This method shall not be employed where either the quantity of air or the velocity of the airflow will adversely affect other portions of the smoke control system, unduly intensify the fire, disrupt plume dynamics or interfere with exiting. Airflow toward the fire shall not exceed 200 feet per minute (1.02 m/s). Where the calculated airflow exceeds this limit, the airflow method shall not be used.

[S] **909.8 Exhaust method.** Where *approved* by the (~~(fire code)~~) *building official*, mechanical smoke control for large enclosed volumes, such as in atriums or malls, shall be permitted to utilize the exhaust method. Smoke control systems using the exhaust method shall be designed in accordance with NFPA 92.

**909.8.1 Smoke layer.** The height of the lowest horizontal surface of the smoke layer interface shall be maintained not less than 6 feet (1829 mm) above a walking surface that forms a portion of a required egress system within the smoke zone.

[S] **909.9 Design fire.** The design fire shall be based on a rational analysis performed by the *registered design professional* and *approved* by the (~~(fire code)~~) *building official*. The design fire shall be based on the analysis in accordance with Section 909.4 and this section. A design fire is not required for stairway and elevator hoistway pressurization system designs.

**909.9.1 Factors considered.** The engineering analysis shall include the characteristics of the fuel, fuel load, effects included by the fire and whether the fire is likely to be steady or unsteady.

**909.9.2 Design fire fuel.** Determination of the design fire shall include consideration of the type of fuel, fuel spacing and configuration.

**909.9.3 Heat-release assumptions.** The analysis shall make use of best available data from *approved* sources and shall not be based on excessively stringent limitations of combustible material.

**909.9.4 Sprinkler effectiveness assumptions.** A documented engineering analysis shall be provided for conditions that assume fire growth is halted at the time of sprinkler activation.

[S] **909.10 Equipment.** Equipment including, but not limited to, fans, ducts, automatic dampers and balance dampers shall be (~~(suitable)~~) *listed* for their intended use, (~~(suitable)~~) *listed* for the probable exposure temperatures that the rational analysis indicates, and as *approved* by the (~~(fire code)~~) *building official*.

**909.10.1 Exhaust fans.** Components of exhaust fans shall be rated and certified by the manufacturer for the probable temperature rise to which the components will be exposed.

**Exception:** An elevated temperature rating is not required for ventilation system fans used to assist in achieving stairway and elevator hoistway pressure differential relationships.

This temperature rise shall be computed by:

$$T_s = (Q_c/mc) + (T_a) \tag{Equation 9-2}$$

where:

- $c$  = Specific heat of smoke at smoke layer temperature, Btu/lb°F (kJ/kg × K).
- $m$  = Exhaust rate, pounds per second (kg/s).
- $Q_c$  = Convective heat output of fire, Btu/s (kW).
- $T_a$  = Ambient temperature, °F (K).
- $T_s$  = Smoke temperature, °F (K).

**Exception:** Reduced  $T_s$  as calculated based on the assurance of adequate dilution air.

**909.10.2 Ducts.** Duct materials and joints shall be capable of withstanding the probable temperatures and pressures to which they are exposed as determined in accordance with Section 909.10.1. Ducts shall be constructed and supported in

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accordance with the *International Mechanical Code*. Ducts shall be leak tested to 1.5 times the maximum design pressure in accordance with nationally accepted practices. Measured leakage shall not exceed 5 percent of design flow. Results of such testing shall be a part of the documentation procedure. Ducts shall be supported directly from *fire-resistance-rated* structural elements of the building by substantial, noncombustible supports.

### Exceptions:

1. Duct leakage testing is not required for stairway or elevator hoistway pressurization systems.
2. Noncombustible supports are not required in low-rise buildings of combustibile construction.
3. Flexible connections, for the purpose of vibration isolation, complying with the *International Mechanical Code* and that are constructed of *approved fire-resistance-rated* materials.

**909.10.3 Equipment, inlets and outlets.** Equipment shall be located so as to not expose uninvolved portions of the building to an additional fire hazard. Outside air inlets shall be located ((~~so~~)) as required by Sections 909.20.5 and 909.20.6, to minimize the potential for introducing smoke or flame into the building. Exhaust outlets shall be so located as to minimize reintroduction of smoke into the building and to limit exposure of the building or adjacent buildings to an additional fire hazard.

**909.10.4 Automatic dampers.** Automatic dampers, regardless of the purpose for which they are installed within the smoke control system, shall be *listed* and conform to the requirements of *approved* recognized standards.

**909.10.5 Fans.** In addition to other requirements, belt-driven fans shall have 1.5 times the number of belts required for the design duty with the minimum number of belts being two. Fans shall be selected for stable performance based on normal temperature and, where applicable, elevated temperature. Calculations and manufacturer's fan curves shall be part of the documentation procedures. Fans shall be supported and restrained by noncombustible devices in accordance with the structural design requirements of Chapter 16 of the *International Building Code*.

### Exceptions:

1. An elevated temperature rating is not required for stairway and elevator hoistway pressurization supply air fans or for ventilation system fans used to assist in achieving stairway and elevator hoistway pressure differential relationships.
2. Noncombustible supports are not required in low-rise buildings of combustibile construction.

Motors driving fans shall not be operated beyond their nameplate horsepower (kilowatts) as determined from measurement of actual current draw and shall have a minimum service factor of 1.15.

**[S] 909.11 ((Standby)) Emergency power.** Smoke control systems shall be provided with ((standby)) emergency power in accordance with Section 1203.

### Exceptions:

1. Stairway pressurization systems for low-rise buildings are permitted to be provided with legally required standby power in accordance with Section 909.20.6.
2. Hoistway pressurization systems for low-rise buildings are permitted to be provided with legally required standby power in accordance with Section 909.21.5.

**Seattle Building Official Interpretation I909.11:** Other building ventilation system fans used to achieve stairway or elevator hoistway pressure differential relationships are considered to be part of the smoke control system and are required to be provided with emergency power in high-rise buildings.

**909.11.1 Equipment room.** The ((standby)) emergency power source and its transfer switches shall be in a room separate from the normal power transformers and switch gears and ventilated directly to and from the exterior. The room shall be enclosed with not less than 1-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both.

### Exceptions:

1. Where located within a sprinklered parking garage of Type I or II construction, emergency power and legally required standby power systems with fixed fuel quantities meeting the limits of Section 603.3 of the International Fire Code, and their transfer switches, are not required to be in a separate room. Other occupancies located in the story where the system is located shall be separated from the system by fire barriers with a minimum 1-hour fire-resistance rating.
2. Combustion and radiator intake air are permitted to be transferred from the adjacent garage. Radiator discharge air is permitted to be transferred to the adjacent garage. Radiator ventilation intake and discharge air locations shall be separated to maintain the radiator ventilation intake air temperature below the maximum temperature allowed to meet the emergency and legally required standby power system loads.

**909.11.2 Power sources and power surges.** Elements of the smoke control system relying on volatile memories or the like shall be supplied with uninterruptable power sources of sufficient duration to span 15-minute primary power interruption. Elements of the smoke control system susceptible to power surges shall be suitably protected by conditioners, suppressors or other *approved* means.

**909.11.3 Wiring.** In addition to meeting requirements of the Seattle Electrical Code, all wiring regardless of voltage, shall have fire-resistance-rated protection of at least two hours or as required in rules promulgated by the *building official*.

**Exceptions:**

1. Subject to the approval of the *building official*, fire-resistance rating is not required for wiring located in a parking garage.
2. Wiring serving building ventilation system fans used to achieve stairway or elevator hoistway pressure differential relationships need not be protected unless protection is required by other provisions in this or other codes.
3. Wiring serving stairway or elevator hoistway pressurization systems in low-rise buildings is permitted to have fire-resistance-rated protection consistent with the fire-resistance rating of the stairway or elevator hoistway.

**909.12 Detection and control systems.** Fire detection systems providing control input or output signals to mechanical smoke control systems or elements thereof shall comply with the requirements of Section 907. Such systems shall be equipped with a control unit complying with UL 864 and *listed* as smoke control equipment.

[S] **909.12.1 Verification.** Control systems for mechanical smoke control systems shall include provisions for verification. Verification shall include positive confirmation of actuation, testing, manual override and the presence of power downstream of all disconnects. A preprogrammed weekly test sequence shall report abnormal conditions audibly, visually and by printed report. The preprogrammed weekly test shall operate all devices, equipment and components used for smoke control.

**Exceptions:**

1. Weekly testing is not required for stairway and hoistway pressurization systems.
2. Where verification of individual components tested through the preprogrammed weekly testing sequence will interfere with, and produce unwanted effects to, normal building operation, such individual components are permitted to be bypassed from the preprogrammed weekly testing, where *approved* by the *fire code official* and in accordance with both of the following:
  - 2.1. Where the operation of components is bypassed from the preprogrammed weekly test, presence of power downstream of all disconnects shall be verified weekly by a *listed* control unit.
  - 2.2. Testing of all components bypassed from the preprogrammed weekly test shall be in accordance with Section 909.22.6.

[S] **909.12.2 Wiring.** ~~(In addition to meeting requirements of NFPA 70, all wiring, regardless of voltage, shall be fully enclosed within continuous raceways.)~~ See Section 909.11.3.

**909.12.3 Activation.** Smoke control systems shall be activated in accordance with this section.

**909.12.3.1 Pressurization, airflow or exhaust method.** Mechanical smoke control systems using the pressurization, airflow or exhaust method shall have completely automatic control.

**909.12.3.2 Passive method.** Passive smoke control systems actuated by *approved* spot-type detectors *listed* for releasing service shall be permitted.

**909.12.4 Automatic control.** Where completely automatic control is required or used, the automatic-control sequences shall be initiated from an appropriately zoned *automatic sprinkler system* complying with Section 903.3.1.1, manual controls provided with *ready access* for the fire department and any smoke detectors required by the engineering analysis.

**909.13 Control air tubing.** Control air tubing shall be of sufficient size to meet the required response times. Tubing shall be flushed clean and dry prior to final connections and shall be adequately supported and protected from damage. Tubing passing through concrete or masonry shall be sleeved and protected from abrasion and electrolytic action.

[S] **909.13.1 Materials.** Control air tubing shall be hard drawn copper, Type L, ACR in accordance with ASTM B42, ASTM B43, ASTM B68/B68M, ASTM B88, ASTM B251 and ASTM B280. Fittings shall be wrought copper or brass, solder type, in accordance with ASME B16.18 or ASME B16.22. Changes in direction shall be made with appropriate tool bends. Brass compression-type fittings shall be used at final connection to devices; other joints shall be brazed using a BCuP5 brazing alloy with solidus above 1,100°F (593°C) and liquidus below 1,500°F (816°C). Brazing flux shall be used on copper-to-brass joints only.

**Exception:** Nonmetallic tubing used within control panels and at the final connection to devices, provided that all of the following conditions are met:

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1. Tubing shall comply with the requirements of Section 602.2.1.3 of the (~~International~~) *Seattle Mechanical Code*.
2. Tubing and the connected device shall be completely enclosed within a galvanized or paint-grade steel enclosure having a minimum thickness of 0.0296 inch (0.7534 mm) (No. 22 gage). Entry to the enclosure shall be by copper tubing with a protective grommet of neoprene or Teflon or by suitable brass compression to male-barbed adapter.
3. Tubing shall be identified by appropriately documented coding.
4. Tubing shall be neatly tied and supported within the enclosure. Tubing bridging cabinets and doors or moveable devices shall be of sufficient length to avoid tension and excessive stress. Tubing shall be protected against abrasion. Tubing connected to devices on doors shall be fastened along hinges.

**909.13.2 Isolation from other functions.** Control tubing serving other than smoke control functions shall be isolated by automatic isolation valves or shall be an independent system.

**909.13.3 Testing.** Control air tubing shall be tested at three times the operating pressure for not less than 30 minutes without any noticeable loss in gauge pressure prior to final connection to devices.

**909.14 Marking and identification.** The detection and control systems shall be clearly marked at all junctions, accesses and terminations.

**[S] 909.15 Control diagrams.** Identical control diagrams showing all devices in the system and identifying their location and function shall be maintained current and kept on file (~~with the fire code official, the fire department and~~) in the *fire command center*, (~~in a format and manner approved by the fire code official.~~)

**Exception:** Control diagrams for stairway or elevator hoistway pressurization systems in low-rise buildings shall be located at the fire alarm control panel.

**[S] 909.16 Fire fighter's smoke control panel.** A fire fighter's smoke control panel for fire department emergency response purposes only shall be provided and shall include manual control or override of automatic control for mechanical smoke control systems. The panel shall be located in a *fire command center* complying with Section 508 in high-rise buildings or buildings with smoke-protected assembly seating. In all other buildings, the fire fighter's smoke control panel shall be installed in an *approved* location adjacent to the fire alarm control panel. The fire fighter's smoke control panel shall comply with Sections 909.16.1 through 909.16.3. The smoke control panel for high rise buildings shall include a visual depiction of the building showing typical floor plan(s) with locations of interior exit stairways and elevator hoistways. The panel shall also include section views of the building to show the extent of travel for each interior exit stairway and elevator. Interior exit stairways and elevator hoistways shall be labeled on the plan section views to match the labeling used in the building itself.

**Exception:** For buildings that use only stairway and elevator hoistway pressurization for smoke control, pressurization fan status and controls in accordance with Section 909.16.2 (or equivalent) may be installed on the main fire alarm control panel (FACP) in lieu of installing a dedicated fire fighter's smoke control panel. The building graphics normally provided on the smoke control panel shall be laminated and mounted in the vicinity of the FACP for quick reference by emergency responders.

**Note:** This exception may be applied to ventilation systems other than interior exit stairway supply air systems to exhaust air from adjacent space.

**909.16.1 Smoke control systems.** Fans within the building shall be shown on the fire fighter's control panel. Fan control switches shall be located on the panel in vicinity of the location where the shaft supplied by each fan is depicted. A clear indication of the direction of airflow and the relationship of components shall be displayed. Status indicators shall be provided for all (~~smoke control equipment, annunciated by fan and zone and by pilot lamp type indicators~~) fans as follows:

1. Fans (~~(dampers and other operating equipment in their normal)~~) in a ready/non-operating status—WHITE.
2. Fans (~~(dampers and other operating equipment)~~) in their off (~~(or closed)~~) status—RED.
3. Fans (~~(dampers and other operating equipment in their on or open status)~~) in operation—GREEN.
4. Fans (~~(dampers and other operating equipment)~~) in a fault (~~(status)~~) condition—YELLOW/AMBER.

**909.16.2 Smoke control panel.** The fire fighter's control panel shall provide control capability over the complete smoke control system equipment within the building as follows:

1. ON-AUTO-OFF control over each (~~(individual piece of operating smoke control equipment that can be controlled from other sources within the building)~~) shaft pressurization fan. (~~(This includes stairway pressurization fans; smoke exhaust fans; supply, return and exhaust fans; elevator shaft fans; and other operating equipment used or intended for smoke control purposes.)~~)

2. ~~((OPEN-AUTO-CLOSE control over individual dampers relating to smoke control and that are controlled from other sources within the building.))~~ AUTO-OFF-POSITIVE PRESSURE-NEGATIVE PRESSURE control over each smoke control zone designed with such features. Individual control of each damper and fan used to achieve the positive or negative pressure condition is not required.
3. ~~((ON-OFF or OPEN-CLOSE control over smoke control and other critical equipment associated with a fire or smoke emergency and that can only be controlled from the fire fighter's control panel.))~~ AUTO-EXHAUST-OFF control over each smoke control zone using the exhaust method of smoke control.

**Exceptions:**

1. Complex systems, where *approved*, where the controls and indicators are combined to control and indicate all elements of a single smoke zone as a unit.
2. Complex systems, where *approved*, where the control is accomplished by computer interface using *approved*, plain English commands.

**909.16.3 Control action and priorities.** The fire fighter's control panel actions shall be as follows:

1. ON-OFF and OPEN-CLOSE control actions shall have the highest priority of any control point within the building. Once issued from the fire fighter's control panel, automatic or manual control from any other control point within the building shall not contradict the control action. Where automatic means are provided to interrupt normal, non-emergency equipment operation or produce a specific result to safeguard the building or equipment including, but not limited to, duct freezestats, duct smoke detectors, high-temperature cutouts, temperature-actuated linkage and similar devices, such means shall be capable of being overridden by the fire fighter's control panel. The last control action as indicated by each fire fighter's control panel switch position shall prevail. Control actions shall not require the smoke control system to assume more than one configuration at any one time.

**Exception:** Power disconnects required by ~~((NFPA 70))~~ the Seattle Electrical Code.

2. Only the AUTO position of each three-position firefighter's control panel switch shall allow automatic or manual control action from other control points within the building. The AUTO position shall be the NORMAL, non-emergency, building control position. Where a fire fighter's control panel is in the AUTO position, the actual status of the device (on, off, open, closed) shall continue to be indicated by the status indicator described in Section 909.16.1. Where directed by an automatic signal to assume an emergency condition, the NORMAL position shall become the emergency condition for that device or group of devices within the zone. Control actions shall not require the smoke control system to assume more than one configuration at any one time.

**909.17 System response time.** Smoke-control system activation shall be initiated immediately after receipt of an appropriate automatic or manual activation command. Smoke control systems shall activate individual components (such as dampers and fans) in the sequence necessary to prevent physical damage to the fans, dampers, ducts and other equipment. For purposes of smoke control, the fire fighter's control panel response time shall be the same for automatic or manual smoke control action initiated from any other building control point. The total response time, including that necessary for detection, shutdown of operating equipment and smoke control system startup, shall allow for full operational mode to be achieved before the conditions in the space exceed the design smoke condition. Upon receipt of an alarm condition at the fire alarm control panel, fans, dampers and automatic doors shall have achieved their proper operating state and the final status shall be indicated at the smoke control panel within 90 seconds. The system response time for each component and their sequential relationships shall be detailed in the required rational analysis and verification of their installed condition reported in the required final report.

**[S] 909.18 Acceptance testing.** Devices, equipment, components and sequences shall be individually tested. These tests, in addition to those required by other provisions of this code, or as required in rules promulgated by the building official, shall consist of determination of function, sequence and, where applicable, capacity of their installed condition.

**909.18.1 Detection devices.** Smoke or fire detectors that are a part of a smoke control system shall be tested in accordance with Chapter 9 in their installed condition. Where applicable, this testing shall include verification of airflow in both minimum and maximum conditions.

**Note:** Verification of airflow in stairway or elevator hoistway pressurization systems is only required to verify compliance with duct detector listing.

**909.18.2 Ducts.** Ducts that are part of a smoke control system shall be traversed using generally accepted practices to determine actual air quantities.

**Exception:** Ducts that are part of a stairway or elevator hoistway pressurization system need not be traversed.

**909.18.3 Dampers.** Dampers shall be tested for function in their installed condition.



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**909.18.4 Inlets and outlets.** Inlets and outlets shall be read using generally accepted practices to determine air quantities.

**Exception:** Air quantities are not required to be determined for stairway or elevator hoistway pressurization systems unless specifically required by other sections in this code.

**909.18.5 Fans.** Fans shall be examined for correct rotation. Measurements of voltage, amperage, revolutions per minute and belt tension shall be made.

**909.18.6 Smoke barriers.** Measurements using inclined manometers or other *approved* calibrated measuring devices shall be made of the pressure differences across *smoke barriers*. Such measurements shall be conducted for each possible smoke control condition.

**909.18.7 Controls.** Each smoke zone equipped with an automatic-initiation device shall be put into operation by the actuation of one such device. Each additional device within the zone shall be verified to cause the same sequence without requiring the operation of fan motors in order to prevent damage. Control sequences shall be verified throughout the system, including verification of override from the fire fighter's control panel and simulation of ~~((standby))~~ emergency power conditions.

**[S] 909.18.8 Testing for smoke control.** Smoke control systems shall be tested by a special inspector for compliance with the *approved* design in accordance with Section ~~((1705.19))~~ 1705.18 of the *International Building Code*.

**909.18.8.1 Scope of testing.** Testing shall be conducted ~~((in accordance with the following:))~~ prior to occupancy and after sufficient completion for the purposes of pressure-difference testing, flow measurements, and detection and control verification.

- ~~((1. During erection of ductwork and prior to concealment for the purposes of leakage testing and recording of device location.~~
2. Prior to occupancy and after sufficient completion for the purposes of pressure-difference testing, flow measurements, and detection and control verification.

**909.18.8.2 Qualifications.** *Approved* agencies for smoke control testing shall have expertise in fire protection engineering, mechanical engineering and certification as air balancers.

**[S] 909.18.8.3 Reports.** A complete report of testing and a maintenance and operational testing program per Section 909.22 shall be prepared by the *approved* agency. The report shall include identification of all devices by manufacturer, nameplate data, design values, measured values and identification tag or mark. The report shall be reviewed by the responsible *registered design professional* and, when satisfied that the design intent has been achieved, the responsible *registered design professional* shall sign, seal and date the report.

**[S] 909.18.8.3.1 Report filing.** ~~((A copy))~~ Copies of the final report and the maintenance and operational testing program per Section 909.22.1 shall be filed with the *building official* and the *fire code official*. ~~((and an))~~ An identical copy shall be maintained in an *approved* location at the building and shall be made available to the fire department upon request.

**Exception:** A copy of the final report need not be maintained at low-rise buildings using stairway or elevator hoistway pressurization.

**909.18.9 Identification and documentation.** Charts, drawings and other documents identifying and locating each component of the smoke control system, and describing their proper function and maintenance requirements, shall be maintained on file at the building as an attachment to the report required by Section 909.18.8.3. Devices shall have an *approved* identifying tag or mark on them consistent with the other required documentation and shall be dated indicating the last time they were successfully tested and by whom.

**[S] 909.19 System acceptance.** Buildings, or portions thereof, required by this code to comply with this section shall not be issued a certificate of occupancy until such time that the ~~((fire code))~~ *building official* determines that the provisions of this section have been fully ~~((complied with and that the fire department has received satisfactory instruction on the operation, both automatic and manual, of the system and a written maintenance program complying with the requirements of Section 909.22.1 has been submitted and approved by the fire code official))~~ met.

**Exception:** In buildings of phased construction, a temporary certificate of occupancy, as *approved* by the ~~((fire code))~~ *building official*, shall be allowed, provided that those portions of the building to be occupied meet the requirements of this section and that the remainder does not pose a significant hazard to the safety of the proposed occupants or adjacent buildings.

**[S][BF] 909.20 ((Smokeproof enclosures)) RESERVED.** ~~((Where required by Section 1023.12, a smokeproof enclosure shall be constructed in accordance with this section. A smokeproof enclosure shall consist of an interior exit stairway or ramp that is enclosed in accordance with the applicable provisions of Section 1023 and an open exterior balcony or ventilated vestibule meeting the requirements of this section. Where access to the roof is required, such access shall be from the smokeproof enclosure where a smokeproof enclosure is required.))~~

**[BF] 909.20.1 ((Access)) RESERVED.** ((Access to the *stairway* or *ramp* shall be by way of a vestibule or an open exterior balcony. The minimum dimension of the vestibule shall be not less than the required width of the *corridor* leading to the vestibule but shall not have a width of less than 44 inches (1118 mm) and shall not have a length of less than 72 inches (1829 mm) in the direction of egress travel.))

**[BF] 909.20.2 ((Construction)) RESERVED.** ((The *smokeproof enclosure* shall be separated from the remainder of the building by not less than 2-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both. Openings are not permitted other than the required *means of egress* doors. The vestibule shall be separated from the *stairway* or *ramp* by not less than 2-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both. The open exterior balcony shall be constructed in accordance with the *fire-resistance-rating* requirements for floor assemblies.

**[BF] 909.20.2.1 Door closers.** Doors in a *smokeproof enclosure* shall be self-closing or automatic-closing by actuation of a smoke detector in accordance with Section 716.2.6.6 of the *International Building Code* and shall be installed at the floor side entrance to the *smokeproof enclosure*. The actuation of the smoke detector on any door shall activate the closing devices on all doors in the *smokeproof enclosure* at all levels. Smoke detectors shall be installed in accordance with Section 907.3.))

**[BF] 909.20.3 ((Natural ventilation alternative)) RESERVED.** ((The provisions of Sections 909.20.3.1 through 909.20.3.3 shall apply to ventilation of *smokeproof enclosures* by natural means.

**[BF] 909.20.3.1 Balcony doors.** Where access to the *stairway* or *ramp* is by way of an open exterior balcony, the door assembly into the enclosure shall be a fire door assembly in accordance with Section 716 of the *International Building Code*.

**[BF] 909.20.3.2 Vestibule doors.** Where access to the *stairway* or *ramp* is by way of a vestibule, the door assembly into the vestibule shall be a fire door assembly complying with Section 716 of the *International Building Code*. The door assembly from the vestibule to the *stairway* shall have not less than a 20-minute *fire protection rating* complying with Section 716 of the *International Building Code*.

**[BF] 909.20.3.3 Vestibule ventilation.** Each vestibule shall have a minimum net area of 16 square feet (1.5 m<sup>2</sup>) of opening in a wall facing an outer *court*, *yard* or *public way* that is not less than 20 feet (6096 mm) in width.))

**[BF] 909.20.4 ((Mechanical ventilation alternative)) RESERVED.** ((The provisions of Sections 909.20.4.1 through 909.20.4.4 shall apply to ventilation of *smokeproof enclosures* by mechanical means.

**[BF] 909.20.4.1 Vestibule doors.** The door assembly from the building into the vestibule shall be a fire door assembly complying with Section 716.2.2.1 of the *International Building Code*. The door assembly from the vestibule to the *stairway* or *ramp* shall have not less than a 20-minute *fire protection rating* and shall meet the requirements for a smoke door assembly in accordance with Section 716.2.2.1 of the *International Building Code*. The door shall be installed in accordance with NFPA 105.

**[BF] 909.20.4.2 Vestibule ventilation.** The vestibule shall be supplied with not less than one air change per minute and the exhaust shall be not less than 150 percent of supply. Supply air shall enter and exhaust air shall discharge from the vestibule through separate, tightly constructed ducts used only for that purpose. Supply air shall enter the vestibule within 6 inches (152 mm) of the floor level. The top of the exhaust register shall be located at the top of the smoke trap but not more than 6 inches (152 mm) down from the top of the trap, and shall be entirely within the smoke trap area. Doors in the open position shall not obstruct duct openings. Duct openings with controlling dampers are permitted where necessary to meet the design requirements, but dampers are not otherwise required.

**[BF] 909.20.4.2.1 Engineered ventilation system.** Where a specially engineered system is used, the system shall exhaust a quantity of air equal to not less than 90 air changes per hour from any vestibule when in emergency operation mode and shall be sized to handle three vestibules simultaneously. Smoke detectors shall be located at the floor side entrance to each vestibule and shall activate the system for the affected vestibule. Smoke detectors shall be installed in accordance with Section 907.3.

**[BF] 909.20.4.3 Smoke trap.** The vestibule ceiling shall be not less than 20 inches (508 mm) higher than the door opening into the vestibule to serve as a smoke and heat trap and to provide an upward-moving air column. The height shall not be decreased unless approved and justified by design and test.

**[BF] 909.20.4.4 Stairway or ramp shaft air movement system.** The *stairway* or *ramp* shaft shall be provided with a dampered relief opening and supplied with sufficient air to maintain a minimum positive pressure of 0.10 inch of water (25 Pa) in the shaft relative to the vestibule with all doors closed.))

**[S][BF] 909.20.5 Stairway and ramp pressurization ((alternative)) for high-rise and underground buildings.** Where ((the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the vestibule is not required, provided that)) required by Section 403.5.4 or 405.7.2 of the *Seattle Building Code*, each *interior exit*

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stairway or ramp ((is)) shall be pressurized to not less than 0.10 inch of water (25 Pa) and not more than 0.35 inch of water (87 Pa) in the shaft relative to the building measured with all interior exit stairway and ramp doors closed under maximum anticipated conditions of stack effect and wind effect. The pressure differential shall be measured between the interior exit stairway and the adjacent area. In residential buildings, the pressure differential is permitted to be measured between the interior exit stairway and the dwelling units.

### **Exceptions:**

1. Positive pressure with respect to the elevator recall floor is required where elevator cars are at the floor of recall with the elevator doors open, but need not comply with the 0.10 inch of water minimum pressure differential.
2. The pressure differential is permitted to be measured relative to outdoor atmosphere on floors other than the following:
  - 2.1. The fire floor;
  - 2.2. The two floors immediately below the fire floor; and
  - 2.3. The floor immediately above the fire floor.

**909.20.5.1 Supply air.** Air for stairway pressurization shall be supplied at intervals sufficient to maintain the required pressure throughout the interior exit stairway.

**909.20.5.2 Supply air.** Supply air shall be taken directly from an outside, uncontaminated source at least 20 feet (6096 mm) from any mechanical exhaust outlet and the dampered relief opening required by Section 909.20.5.3. The supply air intake shall be located at the exterior of the building. The intake shall be continuous to the exterior of the building. The fan system shall be equipped with two smoke detectors located in accordance with NFPA 72 arranged to automatically shut down the fan system only when both smoke detectors activate. The detectors shall be located downstream of the fan and shall be connected to the fire alarm as a supervisory signal.

**Exception:** The supply air intake need not be located 20 feet (6096 mm) from the dampered relief outlet serving the same stairway. Dampers other than motorized dampers required by the *International Energy Conservation Code* are not permitted in the stairway pressurization system air supply unless approved by the building official.

**909.20.5.3 Dampered relief opening.** The interior exit stairway shall be equipped with a relief opening at the top. The relief opening shall be equipped with a barometric relief damper and a motorized damper that complies with the *International Energy Conservation Code*. The motorized damper shall be of the normally open type (open with the power off). Activation of the damper shall be initiated by the building fire alarm system and by actuation of the *automatic sprinkler system*. The pressurization system shall be capable of maintaining the differential pressure required by Section 909.20.5 while discharging 2,500 cubic feet per minute (1180 L/s) of air through the relief opening. The relief outlet shall be located at least 20 feet (6096 mm) from elevator hoistway and stairway pressurization system supply air intake locations.

**Exception:** The relief outlet need not be located 20 feet (6096 mm) from the supply air intake for the stairway served by the relief outlet.

**[BF] ((909.20.6 Ventilating)) 909.20.5.4 Activation of pressurization equipment.** ((The activation of ventilating equipment required by the alternatives in Sections 909.20.4 and 909.20.5 shall be by smoke detectors installed at each floor level at an approved location at the entrance to the *smokeproof enclosure*. When the closing device for the stairway and ramp shaft and vestibule doors is activated by smoke detection or power failure, the mechanical equipment shall activate and operate at the required performance levels.)) The pressurization equipment required by Section 909.20.5 shall be activated by a fire alarm signal originating anywhere in the building. Smoke detectors shall be installed in accordance with Section 907.3. Activation of the pressurization equipment shall be independent of the position of any dampers in the stairway pressurization air supply system.

**[BF] ((909.20.6.1 Ventilation)) 909.20.5.5 Independence of pressurization systems.** ((*Smokeproof enclosure* ventilation systems)) Stairway pressurization shall be independent of other building ventilation systems.

**Exception:** Building ventilation systems, other than interior exit stairway supply air systems, are permitted to be used to exhaust air from adjacent space where necessary to maintain the differential pressure relationships. Building ventilation systems used to achieve stairway pressurization are not required to comply with Sections 909.10.1 and 909.11.3.

**[S] 909.20.5.6 Protection of equipment.** The equipment, control wiring, power wiring and ductwork shall comply with one of the following:

1. Equipment, control wiring, power wiring and ductwork shall be located exterior to the building and directly connected to the ((*smokeproof enclosure*)) interior exit stairway or connected to the ((*smokeproof enclosure*)) interior exit stairway by ductwork enclosed by ((not less than 2 hour)) fire barriers constructed in accordance with Section 707 of the *International Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *International Building Code*, or both.

2. Equipment, control wiring, power wiring and ductwork shall be located within the ~~((smokeproof enclosure))~~ interior exit stairway with intake or exhaust directly from and to the outside or through ductwork enclosed by not less than 2-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both.
3. Equipment, control wiring, power wiring and ductwork shall be located within the building if separated from the remainder of the building, including other mechanical equipment, by not less than 2-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both.

**Exception:** Control wiring and power wiring located outside of a 2-hour fire barrier construction shall be protected using any one of the following methods:

1. Cables used for survivability of required *critical circuits* shall be *listed* in accordance with UL 2196 and shall have a *fire-resistance rating* of not less than 2 hours.
2. Where encased with not less than 2 inches (51 mm) of concrete.
3. Electrical circuit protective systems shall have a *fire-resistance rating* of not less than 2 hours. Electrical circuit protective systems shall be installed in accordance with their listing requirements.
4. Equipment, control wiring, power wiring, and ductwork serving building ventilation systems other than interior exit stairway supply air systems used to achieve the differential pressure relationships need not be protected.

[BF] ~~((909.20.6.2 Standby))~~ **909.20.5.7 Emergency power.** ~~((Mechanical vestibule and stairway and ramp shaft ventilation))~~ Pressurization systems and automatic fire detection systems shall be provided with ((standby)) emergency power in accordance with Section 1203.

[BF] ~~((909.20.6.3 Acceptance and testing. Before the mechanical equipment is approved, the system shall be tested in the presence of the building official to confirm that the system is operating in compliance with these requirements.))~~

**909.20.6 Stairway pressurization for low-rise buildings.** Where stairway pressurization is provided in accordance with subsection 1006.3.4(7) or subsection 510.2(10) of the Seattle Building Code, the pressurization system shall comply with the following:

1. Stairways shall be pressurized to a minimum positive pressure of 0.15 inch of water column (37 Pa) relative to the main occupied area on each floor, and a maximum pressure that complies with Section 1010.1.3.
2. The stairway pressurization shall be activated by a fire alarm originating anywhere in the building.
3. Pressurization equipment and its duct work located within the building shall be separated from other portions of the building by construction equal to that required for the interior exit stairway.
4. Supply air shall be taken directly from an outside, uncontaminated source at least 20 feet (6096 mm) from any air exhaust system or outlet. Air ducts shall be continuous to the exterior of the building. Two smoke detectors shall be located in the duct in accordance with NFPA 72 arranged to automatically shut down the fan system only when both smoke detectors activate. The detectors shall be located downstream of the fan and shall be connected to the fire alarm as a supervisory signal.
5. A legally required standby power system shall be provided for the pressurization system according to Seattle Electrical Code Section 701. A connection ahead of the service disconnecting means shall be permitted as the sole source of power to the pressurization system.
6. Other measures to prevent loss of pressurization shall be provided in the design and construction of interior exit stairways, such as doors and door closers, quality of workmanship and caulking of penetrations and joints.
7. Stairway pressurization systems in low-rise buildings shall comply with Sections 909.2, 909.3, 909.10, 909.12, 909.13, 909.14, 909.17, 909.18, and 909.19 in addition to Section 909.20.6.

[S][BF] **909.21 Elevator hoistway pressurization alternative.** Where elevator hoistway pressurization is provided in lieu of required enclosed elevator lobbies, the pressurization system shall comply with Sections 909.21.1 through ((909.21.14)) 909.21.7.

[BF] **909.21.1 Pressurization requirements.** Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The pressure differentials shall be measured between the hoistway and the adjacent elevator landing. The opening and closing of hoistway doors at each level must be demonstrated during this test. ((The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.))

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### Exceptions:

1. On floors containing only Group R occupancies, the pressure differential is permitted to be measured between the hoistway and a *dwelling unit* or *sleeping unit*.
2. Where an elevator opens into a lobby enclosed in accordance with Section ~~((3007.6 or 3008.6))~~ 403.6.1.5 or 403.6.2.6 of the *International Building Code*, the pressure differential is permitted to be measured between the hoistway and the space immediately outside the door(s) from the floor to the enclosed lobby.
3. The pressure differential is permitted to be measured relative to the outdoor atmosphere on floors other than the following:
  - 3.1. The fire floor.
  - 3.2. The two floors immediately below the fire floor.
  - 3.3. The floor immediately above the fire floor.
4. The minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to occupied floors is not required at the floor of recall with the doors open.
5. Subject to the approval of the *building official*, pressurization is not required for elevators in high-rise buildings with less than 75 feet (22 860 mm) from the lowest floor to the highest ceiling of the stories served by the elevator.
6. Maximum and minimum pressures are permitted to comply with rules promulgated by the *building official*.

**909.21.1.1 Supply air.** The supply air shall be taken from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any mechanical exhaust outlet and dampered relief openings required by Section 909.20.5.3 of the *International Building Code*. The supply air intake may be located within the building provided it is located no more than 20 feet (6096 mm) from major openings in the building exterior such as loading docks and vehicular entrances. There shall be no obstruction to the flow of air to the intake. Dampers other than motorized dampers required by the *International Energy Conservation Code* are not permitted in the elevator hoistway pressurization system air supply unless *approved by the building official*.

**[BF] ~~((909.21.1.1))~~ 909.21.1.2 Use of ventilation systems.** Ventilation systems, other than hoistway supply air systems, are permitted to be used to exhaust air from adjacent spaces ~~((on the fire floor, two floors immediately below and one floor immediately above the fire floor))~~ to the building's exterior where necessary to maintain positive pressure relationships as required in Section 909.21.1 during operation of the elevator shaft pressurization system. Ventilation systems used to achieve elevator hoistway pressurization are not required to comply with Section 909.21.4 and 909.21.5.

**[BF] 909.21.2 Rational analysis.** A rational analysis complying with Section 909.4 shall be submitted with the *construction documents*.

**Exception:** A rational analysis is not required for elevator hoistway pressurization in low-rise buildings.

**[BF] 909.21.3 Ducts for system.** Any duct system that is part of the pressurization system shall be protected with the same *fire-resistance rating* as required for the elevator ~~((shaft))~~ hoistway enclosure.

**[BF] 909.21.4 Fan system.** The fan system provided for the pressurization system shall be as required by Sections 909.21.4.1 through 909.21.4.4.

**[BF] 909.21.4.1 Fire resistance.** Where located within the building, the fan system that provides the pressurization shall be protected with the same *fire-resistance rating* required for the elevator ~~((shaft))~~ hoistway enclosure.

**[BF] 909.21.4.2 Smoke detection.** The fan system shall be equipped with ~~((#))~~ two smoke detectors ~~((that will))~~ located in accordance with NFPA 72 arranged to automatically shut down the fan system only when both smoke ~~((is detected within the system))~~ detectors activate. The detectors shall be located downstream of the fan and shall be connected to the fire alarm as a supervisory signal.

**[BF] 909.21.4.3 Separate systems.** A separate fan system shall be used for each elevator hoistway.

**[BF] 909.21.4.4 Fan capacity.** The ~~((supply))~~ fan system shall be ~~((either adjustable with a capacity of not less than 1,000 cfm (0.4719 m<sup>3</sup>/s) per door, or that specified by a registered design professional to meet the requirements of a designed pressurization system))~~ provided with the capacity to pressurize the elevator hoistway as determined by a registered design professional. The fan system shall be provided with a means to balance or modulate the airflow to the elevator hoistway to meet the differential pressure requirements on all floors for each condition identified by the rational analysis.

**[BF] 909.21.5 ~~((Standby))~~ Legally required standby and emergency power.** Pressurization systems shall be powered by an *approved* emergency or legally required standby power system. ~~((The))~~ An emergency power system conforming to Section 909.11 shall be provided for pressurization system in high-rise and underground buildings. Legally required standby power shall be provided ~~((with))~~ for the pressurization system in all other buildings. The emergency and legally

required standby power shall be in accordance with Section 1203. For other than high-rise or underground buildings, connection ahead of the service disconnecting means in accordance with Seattle Electrical Code Section 701.12(E) is permitted as a source of legally required standby power.

**[BF] 909.21.6 Activation of pressurization system.** The elevator pressurization system shall be activated upon activation of either the building fire alarm system or the elevator lobby smoke detectors. Where both a building fire alarm system and elevator lobby smoke detectors are present, each shall be independently capable of activating the pressurization system. Activation of the fan serving the hoistway is permitted to be delayed by up to 30 seconds so that elevator recall can be initiated prior to pressurizing the hoistway. Activation of the pressurization equipment shall be independent of the position of any dampers in the elevator hoistway air supply system.

**Note:** Activation of fans serving occupant evacuation elevators is allowed to be delayed, but the elevators must begin occupant evacuation activities and may not be immediately recalled.

~~((**[BF] 909.21.7 Testing.** Testing for performance shall be required in accordance with Section 909.18.8. System acceptance shall be in accordance with Section 909.19.))~~

**[S] 909.21.7 Machine and control rooms.** Elevator machine and control rooms shall be pressurized in accordance with the section unless separated from the elevator hoistway by construction in accordance with Section 713 of the *International Building Code*.

~~((**[BF] 909.21.8 Marking and identification.** Detection and control systems shall be marked in accordance with Section 909.14.))~~

~~**[BF] 909.21.9 Control diagrams.** Control diagrams shall be provided in accordance with Section 909.15.~~

~~**[BF] 909.21.10 Control panel.** A control panel complying with Section 909.16 shall be provided.~~

~~**[BF] 909.21.11 System response time.** Hoistway pressurization systems shall comply with the requirements for smoke control system response time in Section 909.17.))~~

**[S] 909.22 Maintenance.** ~~((Smoke))~~ New and existing smoke control systems shall be maintained to ensure to a reasonable degree that the system is capable of controlling smoke for the duration required. The system shall be maintained and tested in accordance with the maintenance and operational testing program developed in accordance with NFPA 92, manufacturer's instructions and Sections 909.22.1 through 909.22.6.

**909.22.1 Schedule.** A routine maintenance and operational testing program shall be initiated immediately after the smoke control system has passed the acceptance tests. A written schedule for routine maintenance and operational testing shall be established.

**[S] 909.22.2 Records.** Records of smoke control system testing and maintenance shall be maintained. The record shall include the date of the maintenance, identification of the servicing personnel and notification of any unsatisfactory condition and the corrective action taken, including parts replaced. Reports of inspections and testing and the maintenance and operational testing program developed in accordance with NFPA 92 shall be submitted to the fire code official by way of the department's third-party vendor, thecomplianceengine.com.

**[S] 909.22.3 Testing.** Operational testing of the smoke control system shall include all equipment such as initiating devices, fans, dampers, controls, doors and windows.

**909.22.3.1 Qualifications.** Individuals performing inspections, testing and maintenance of smoke control systems shall have certification from an approved organization or approved school, or other approved certification that is acceptable to the fire code official.

**[S] 909.22.4 Dedicated smoke control systems.** Dedicated smoke control systems shall be operated for each control sequence ~~((semiannually))~~ annually. The system shall be tested under standby power conditions.

**909.22.5 Nondedicated smoke control systems.** Nondedicated smoke control systems shall be operated for each control sequence annually. The system shall be tested under standby power conditions.

**909.22.6 Components bypassing weekly test.** Where components of the smoke control system are bypassed by the preprogrammed weekly test required by Section 909.12.1, such components shall be tested semiannually. The system shall be tested under standby power conditions.

## SECTION 910 SMOKE AND HEAT REMOVAL

**910.1 General.** Where required by this code, smoke and heat vents or mechanical smoke removal systems shall conform to the requirements of this section.

**910.4.3 System design criteria.** The mechanical smoke removal system shall be sized to exhaust the building at a minimum rate of two air changes per hour based on the volume of the building or portion thereof without contents. The capacity of each exhaust fan shall not exceed 30,000 cubic feet per minute (14.2 m<sup>3</sup>/s).

**910.4.3.1 Makeup air.** Makeup air openings shall be provided within 6 feet (1829 mm) of the floor level. Operation of makeup air openings shall be manual or automatic. The minimum gross area of makeup air inlets shall be 8 square feet per 1,000 cubic feet per minute (0.74 m<sup>2</sup> per 0.4719 m<sup>3</sup>/s) of smoke exhaust.

**910.4.4 Activation.** The mechanical smoke removal system shall be activated by manual controls only.

**910.4.5 Manual control location.** Manual controls shall be located where they are able to be accessed by the fire service from an exterior door of the building and separated from the remainder of the building by not less than 1-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both.

**[S] 910.4.6 Control wiring.** Wiring for operation and control of mechanical smoke removal systems shall be connected ahead of the main disconnect in accordance with Section 701.12E of ((NFPA-70)) the Seattle Electrical Code and be protected against interior fire exposure to temperatures in excess of 1,000°F (538°C) for a period of not less than 15 minutes.

**910.4.7 Controls.** Where building air-handling and mechanical smoke removal systems are combined or where independent building air-handling systems are provided, fans shall automatically shut down in accordance with the *International Mechanical Code*. The manual controls provided for the smoke removal system shall have the capability to override the automatic shutdown of fans that are part of the smoke removal system.

**910.5 Maintenance and testing.** Maintenance and testing of smoke and heat vents and mechanical smoke removal systems shall be in accordance with Sections 910.5.1 and 910.5.2. A written record of inspection, testing and maintenance that includes the date, identification of personnel involved, any unsatisfactory result, corrective action taken and replaced parts shall be maintained on the premises.

**910.5.1 Smoke and heat vents.** Smoke and heat vents shall be maintained in an operative condition. Inspection, testing and maintenance shall be in accordance with NFPA 204 except as follows:

1. Mechanically operated smoke and heat vents shall be inspected annually and operationally tested not less than every 5 years.
2. Gravity dropout smoke and heat vents shall be inspected annually.
3. Fused, damaged or painted fusible links shall be replaced.

**910.5.2 Mechanical smoke removal systems.** Mechanical smoke removal systems shall be maintained in accordance with NFPA 204 and the equipment manufacturer's instructions except as follows:

1. Systems shall be inspected and operationally tested annually.
2. Testing shall include the operation of all system components, controls and ancillary equipment, such as makeup air openings.
3. A written schedule for routine maintenance and operational testing shall be established and testing shall be conducted in accordance with the schedule.

## SECTION 911 EXPLOSION CONTROL

**911.1 General.** Explosion control shall be provided in the following locations:

1. Where a structure, room or space is occupied for purposes involving explosion hazards as identified in Table 911.1.
2. Where quantities of hazardous materials specified in Table 911.1 exceed the maximum allowable quantities in Table 5003.1.1(1).

Such areas shall be provided with explosion (*deflagration*) venting, explosion (*deflagration*) prevention systems or *barri- cades* in accordance with this section and NFPA 68, NFPA 69 or NFPA 495 as applicable. *Deflagration* venting shall not be utilized as a means to protect buildings from *detonation* hazards.

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**TABLE 911.1  
EXPLOSION CONTROL REQUIREMENTS<sup>f</sup>**

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
<b>Hazard Category</b>			
Combustible dusts <sup>a</sup>	—	Not required	Required
Cryogenic fluids	Flammable	Not required	Required
Explosives	Division 1.1	Required	Not required
	Division 1.2	Required	Not required
	Division 1.3	Not required	Required
	Division 1.4	Not required	Required
	Division 1.5	Required	Not required
	Division 1.6	Required	Not required
Flammable gas	Gaseous	Not required	Required
	Liquefied	Not required	Required
Flammable liquids	IA <sup>b</sup>	Not required	Required
	IB <sup>c</sup>	Not required	Required
Organic peroxides	Unclassified detonable	Required	Not permitted
	I	Required	Not permitted
Oxidizer liquids and solids	4	Required	Not permitted
Pyrophoric	Gases	Not required	Required
Unstable (reactive)	4	Required	Not permitted
	3 detonable	Required	Not permitted
	3 nondetonable	Not required	Required
Water-reactive liquids and solids	3	Not required	Required
	2 <sup>e</sup>	Not required	Required
<b>Special Uses</b>			
Acetylene generator rooms	—	Not required	Required
Electrochemical energy storage systems <sup>g</sup>	—	Not required	Required
Energy storage systems <sup>g</sup>	—	Not required	Required
Grain processing	—	Not required	Required
Liquefied petroleum gas distribution facilities	—	Not required	Required
Where explosion hazards exist <sup>d</sup>	Detonation	Required	Not permitted
	Deflagration	Not required	Required

a. Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.8.2. See definition of “Combustible dust” in Chapter 2.

b. Storage or use.

c. In open use or dispensing.

d. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

e. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.

f. Explosion venting is not required for Group H-5 Fabrication Areas complying with Chapter 27 and the ((*International*)) *Seattle Building Code*.

g. Where explosion control is required in Section 1207.6.3.

**911.2 Required deflagration venting.** Areas that are required to be provided with *deflagration* venting shall comply with the following:

1. Walls, ceilings and roofs exposing surrounding areas shall be designed to resist a minimum internal pressure of 100 pounds per square foot (psf) (4788 Pa). The minimum internal design pressure shall be not less than five times the maximum internal relief pressure specified in Item 5 of this section.
2. *Deflagration* venting shall be provided only in exterior walls and roofs.

**Exception:** Where sufficient *exterior wall* and roof venting cannot be provided because of inadequate exterior wall or roof area, *deflagration* venting shall be allowed by specially designed shafts vented to the exterior of the building.



3. *Deflagration* venting shall be designed to prevent unacceptable structural damage. Where relieving a *deflagration*, vent closures shall not produce projectiles of sufficient velocity and mass to cause life threatening injuries to the occupants or other persons on the property or adjacent *public ways*.
4. The aggregate clear area of vents and venting devices shall be governed by the pressure resistance of the construction assemblies specified in Item 1 of this section and the maximum internal pressure allowed by Item 5 of this section.
5. Vents shall be designed to withstand loads in accordance with the *International Building Code*. Vents shall consist of any one or any combination of the following to relieve at a maximum internal pressure of 20 pounds per square foot (958 Pa), but not less than the loads required by the *International Building Code*:
  - 5.1. *Exterior walls* designed to release outward.
  - 5.2. Hatch covers.
  - 5.3. Outward swinging doors.
  - 5.4. Roofs designed to uplift.
  - 5.5. Venting devices *listed* for the purpose.
6. Vents designed to release from the *exterior walls* or roofs of the building when venting a *deflagration* shall discharge directly to the exterior of the building where an unoccupied space not less than 50 feet (15 240 mm) in width is provided between the *exterior walls* of the building and the *lot line*.

**Exception:** Vents complying with Item 7 of this section.
7. Vents designed to remain attached to the building when venting a *deflagration* shall be so located that the discharge opening shall be not less than 10 feet (3048 mm) vertically from window openings and *exits* in the building and 20 feet (6096 mm) horizontally from *exits* in the building, from window openings and *exits* in adjacent buildings on the same lot and from the *lot line*.
8. Discharge from vents shall not be into the interior of the building.

**911.3 Explosion prevention systems.** Explosion prevention systems shall be of an *approved* type and installed in accordance with the provisions of this code and NFPA 69.

**911.4 Deflagration venting.** *Deflagration* venting shall be of an *approved* type and installed in accordance with the provisions of this code and NFPA 68.

**911.5 Barricades.** *Barricades* shall be designed and installed in accordance with NFPA 495.

## SECTION 912 FIRE DEPARTMENT CONNECTIONS

**912.1 Installation.** Fire department connections shall be installed in accordance with the NFPA standard applicable to the system design and shall comply with Sections 912.2 through 912.7.

**912.2 Location.** With respect to hydrants, driveways, buildings and landscaping, fire department connections shall be so located that fire apparatus and hose connected to supply the system will not obstruct access to the buildings for other fire apparatus. The location of fire department connections shall be *approved* by the *fire code official*.

**[S] 912.2.1 Visible location.** Fire department connections shall be located on the ((~~street~~)) *address* side of buildings or facing *approved* fire apparatus access roads, fully visible and recognizable from the street, fire apparatus access road or nearest point of fire department vehicle access or as otherwise *approved* by the *fire code official*.

**912.2.2 Existing buildings.** On existing buildings, wherever the fire department connection is not visible to approaching fire apparatus, the fire department connection shall be indicated by an *approved* sign mounted on the street front or on the side of the building. Such sign shall have the letters "FDC" not less than 6 inches (152 mm) high and words in letters not less than 2 inches (51 mm) high or an arrow to indicate the location. Such signs shall be subject to the approval of the *fire code official*.

**[S] 912.2.3 High-rise buildings.** Fire department connections for high-rise buildings shall be placed a distance apart not less than three-quarters of the length of the maximum overall diagonal dimension of the building served measured in a straight-line between the connections, or as otherwise *approved* by the *fire code official*.

**912.3 Fire hose threads.** Fire hose threads used in connection with standpipe systems shall be *approved* and shall be compatible with fire department hose threads.

**912.4 Access.** Immediate access to fire department connections shall be maintained at all times and without obstruction by fences, bushes, trees, walls or any other fixed or moveable object. Access to fire department connections shall be *approved* by the *fire code official*.

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**Exception:** Fences, where provided with an access gate equipped with a sign complying with the legend requirements of Section 912.5 and a means of emergency operation. The gate and the means of emergency operation shall be *approved* by the *fire code official* and maintained operational at all times.

**912.4.1 Locking fire department connection caps.** The *fire code official* is authorized to require locking caps on fire department connections for water-based *fire protection systems* where the responding fire department carries appropriate key wrenches for removal.

**912.4.2 Clear space around connections.** A working space of not less than 36 inches (914 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height shall be provided and maintained in front of and to the sides of wall-mounted fire department connections and around the circumference of free-standing fire department connections, except as otherwise required or *approved* by the *fire code official*.

**912.4.3 Physical protection.** Where fire department connections are subject to impact by a motor vehicle, vehicle impact protection shall be provided in accordance with Section 312.

**[S] 912.5 Signs.** A metal sign with raised letters not less than 1 inch (25 mm) in size shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections. Such signs shall read: "AUTOMATIC SPRINKLERS" or "STANDPIPES" or "TEST CONNECTION" or a combination thereof as applicable per NFPA 14. Where the fire department connection does not serve the entire building, a sign shall be provided indicating the portions of the building served.

**[S] 912.5.1 Signs for high-rise buildings.** An additional sign with letters at least 1 inch (25 mm) in size shall be provided at the fire department connections of high-rise buildings that indicate the building fire pump static (churn) discharge pressure. Where the pump is more than two stories above or below the fire department connections, the pump static/churn discharge pressure on the signage shall be adjusted to correct for the elevation difference.

**[S] 912.6 Backflow protection.** The potable water supply to automatic sprinkler and standpipe systems shall be protected against backflow as required by the (~~International~~) *Uniform Plumbing Code*.

**912.7 Inspection, testing and maintenance.** Fire department connections shall be periodically inspected, tested and maintained in accordance with NFPA 25. Records of inspection, testing and maintenance shall be maintained.

## SECTION 913 FIRE PUMPS

**913.1 General.** Where provided, fire pumps for *fire protection systems* shall be installed in accordance with this section and NFPA 20.

**Exception:** Pumps for *automatic sprinkler systems* installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code*.

**913.2 Protection against interruption of service.** The fire pump, driver and controller shall be protected in accordance with NFPA 20 against possible interruption of service through damage caused by explosion, fire, flood, earthquake, rodents, insects, windstorm, freezing, vandalism and other adverse conditions.

**[W][S] 913.2.1 Protection of fire pump rooms.** (~~Rooms where fire pumps are located shall be separated from all other areas of the building in accordance with Section 913.2.1 of the *International Building Code*.~~) Fire pumps shall be located in rooms that are separated from all other areas of the building by 2-hour fire barriers constructed in accordance with Section 707 of the *International Building Code* or 2-hour horizontal assemblies constructed in accordance with Section 711 of the *International Building Code*, or both.

**913.2.2 Circuits supplying fire pumps.** Cables used for survivability of circuits supplying fire pumps shall be protected using one of the following methods:

1. Cables used for survivability of required *critical circuits* shall be *listed* in accordance with UL 2196 and shall have a *fire-resistance rating* of not less than 1 hour.
2. Electrical circuit protective systems shall have a *fire-resistance rating* of not less than 1 hour. Electrical circuit protective systems shall be installed in accordance with their listing requirements.
3. Construction having a *fire-resistance rating* of not less than 1 hour.
4. The cable or raceway is encased in a minimum of 2 inches (51 mm) of concrete.

**Exception:** This section shall not apply to cables, or portions of cables, located within a fire pump room or generator room that is separated from the remainder of the occupancy with *fire-resistance-rated* construction.

**913.3 Temperature of pump room.** Suitable means shall be provided for maintaining the temperature of a pump room or pump house, where required, above 40°F (5°C).

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**914.3 High-rise buildings.** High-rise buildings shall comply with Sections 914.3.1 through 914.3.7.

**[S] 914.3.1 Automatic sprinkler system.** Buildings and structures shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, 903.3.1.1.3 and a secondary water supply where required by Section 914.3.2.

**Exception:** An *automatic sprinkler system* shall not be required in spaces or areas of telecommunications equipment buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided that those spaces or areas are equipped throughout with an automatic fire detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or not less than 2-hour *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both.

~~(**914.3.1.1 Number of sprinkler risers and system design.** Each sprinkler system zone in buildings that are more than 420 feet (128 m) in height shall be supplied by not fewer than two risers. Each riser shall supply sprinklers on alternate floors. If more than two risers are provided for a zone, sprinklers on adjacent floors shall not be supplied from the same riser.)~~

**914.3.1.1.1 Riser location.** Sprinkler risers shall be placed in *interior exit stairways* and *ramps* that are remotely located in accordance with Section 1007.

**[S] 914.3.1.2 Water supply to required fire pumps.** In ~~((all buildings that are more than 420 feet (128 m) in building height, and))~~ buildings of Type IVA and IVB construction that are more than 120 feet (36.6 m) in *building height*, required fire pumps shall be supplied by connections to not fewer than two water mains located in different streets. Separate supply piping shall be provided between each connection to the water main and the pumps. Each connection and the supply piping between the connection and the pumps shall be sized to supply the flow and pressure required for the pumps to operate.

**Exception:** Two connections to the same main shall be permitted provided that the main is valved such that an interruption can be isolated so that the water supply will continue without interruption through not fewer than one of the connections.

**[S] 914.3.2 Secondary water supply.** An automatic secondary on-site water supply having a capacity providing a net volume of 33,000 gallons or a volume that is not less than the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings assigned to Seismic Design Category C, D, E or F as determined by the *International Building Code*. An additional fire pump shall not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the *automatic sprinkler system*. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13, unless another duration is required by the fire code official.

**914.3.3 Fire alarm system.** A fire alarm system shall be provided in accordance with Section 907.2.13.

**914.3.4 Automatic smoke detection.** Smoke detection shall be provided in accordance with Section 907.2.13.1.

**914.3.5 Emergency voice/alarm communication system.** An emergency voice/alarm communication system shall be provided in accordance with Section 907.5.2.2.

**914.3.6 Emergency responder communication coverage.** In-building, two-way emergency responder communication coverage shall be provided in accordance with Section 510.

**914.3.7 Fire command.** A *fire command center* complying with Section 508 shall be provided in a location *approved* by the fire department.

**914.4 Atriums.** Atriums shall comply with Sections 914.4.1 and 914.4.2.

**[S] 914.4.1 Automatic sprinkler system.** An *approved automatic sprinkler system* shall be installed throughout the entire building.

**Exceptions:**

1. That area of a building adjacent to or above the atrium need not be sprinklered, provided that portion of the building is separated from the atrium portion by not less than a 2-hour *fire barrier* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both.
2. Where the ceiling of the atrium is more than 55 feet (16 764 mm) above ~~((the floor))~~ any floor area open to the atrium, sprinkler protection at the ceiling of the atrium is not required.

**914.4.2 Fire alarm system.** A fire alarm system shall be provided where required by Section 907.2.14.

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**[S] TABLE 914.8.3  
HANGAR FIRE SUPPRESSION REQUIREMENTS<sup>a, b, c</sup>**

MAXIMUM SINGLE FIRE AREA (square feet)	INTERNATIONAL BUILDING CODE TYPE OF CONSTRUCTION								
	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
≥ 40,001	Group I	Group I	Group I	Group I	Group I	Group I	Group I	Group I	Group I
40,000	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II
30,000	Group III	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II
20,000	Group III	Group III	Group II	Group II	Group II	Group II	Group II	Group II	Group II
15,000	Group III	Group III	Group III	Group II	Group III	Group II	Group III	Group II	Group II
12,000	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group II	Group II
8,000	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group II
5,000	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group III

For SI: 1 square foot = 0.0929 m<sup>2</sup>, 1 foot = 304.8 mm.

- a. Aircraft hangars with a door height greater than 28 feet shall be provided with fire suppression for a Group I hangar regardless of maximum fire area.
- b. Groups shall be as classified in accordance with NFPA 409.
- c. Membrane structures complying with Section 3102 of the (~~International~~) *Seattle Building Code* shall be classified as a Group IV hangar.

**914.8.3.1 Hazardous operations.** Any Group III aircraft hangar in accordance with Table 914.8.3 that contains hazardous operations including, but not limited to, the following shall be provided with a Group I or II fire suppression system in accordance with NFPA 409 as applicable:

1. Doping.
2. *Hot work* including, but not limited to, welding, torch cutting and torch soldering.
3. Fuel transfer.
4. Fuel tank repair or maintenance not including defueled tanks in accordance with NFPA 409, inerted tanks or tanks that have never been fueled.
5. Spray finishing operations.
6. Total fuel capacity of all aircraft within the unsprinklered single *fire area* in excess of 1,600 gallons (6057 L).
7. Total fuel capacity of all aircraft within the maximum single *fire area* in excess of 7,500 gallons (28 390 L) for a hangar equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1.

**914.8.3.2 Separation of maximum single fire areas.** Maximum single *fire areas* established in accordance with hangar classification and construction type in Table 914.8.3 shall be separated by 2-hour *fire walls* constructed in accordance with Section 706 of the *International Building Code*. In determining the maximum single *fire area* as set forth in Table 914.8.3, ancillary uses that are separated from aircraft servicing areas by not less than a 1-hour *fire barrier* constructed in accordance with Section 707 of the *International Building Code* shall not be included in the area.

**914.8.4 Finishing.** The process of “doping,” involving the use of a volatile flammable solvent, or of painting shall be carried on in a separate detached building equipped with automatic fire-extinguishing equipment in accordance with Section 903.

**914.8.5 Residential aircraft hangar smoke alarms.** Smoke alarms shall be provided within residential aircraft hangars in accordance with Section 907.2.21.

**914.8.6 Aircraft paint hangar fire suppression.** Aircraft paint hangars shall be provided with fire suppression as required by NFPA 409.

**914.9 Application of flammable finishes.** An *automatic sprinkler system* or fire-extinguishing system shall be provided in all spray rooms and spray booths, and shall be installed in accordance with Chapter 9.

**914.10 Drying rooms.** Drying rooms designed for high-hazard materials and processes, including special occupancies as provided for in Chapter 4 of the *International Building Code*, shall be protected by an *approved* automatic fire-extinguishing system complying with the provisions of Chapter 9.

**914.11 Ambulatory care facilities.** Occupancies classified as ambulatory care facilities shall comply with Sections 914.11.1 through 914.11.3.

**914.11.1 Automatic sprinkler systems.** An *automatic sprinkler system* shall be provided for ambulatory care facilities in accordance with Section 903.2.2.

**914.11.2 Manual fire alarm systems.** A manual fire alarm system shall be provided for ambulatory care facilities in accordance with Section 907.2.2.

**914.11.3 Fire alarm systems.** An automatic smoke detection system shall be provided for ambulatory care facilities in accordance with Section 907.2.2.1.

## SECTION 915 CARBON MONOXIDE DETECTION

**[W] 915.1 General.** Carbon monoxide detection shall be installed in new buildings in accordance with Sections 915.1.1 through 915.6. Carbon monoxide detection shall be installed in existing buildings in accordance with ~~(Section 1103.9)~~ Chapter 11.

**915.1.1 Where required.** Carbon monoxide detection shall be provided in Group ~~(I-1, I-2, I-4)~~ I and R occupancies and in classrooms in Group E occupancies in the locations specified in Section 915.2 where any of the conditions in Sections 915.1.2 through 915.1.6 exist.

### **Exceptions:**

1. R-2 occupancies, with the exception of R-2 college dormitories, are required to install carbon monoxide detectors without exception.
2. Sleeping units or dwelling units in Group I and R-1 occupancies and R-2 college dormitories, hotel, DOC prisons and work releases and DSHS licensed boarding home and residential treatment facilities, which do not themselves contain a fuel-burning appliance, a fuel-burning fireplace, or have an attached garage, need not be provided with carbon monoxide alarms provided that they comply with the exceptions of Section 915.1.4.

**915.1.2 Fuel-burning appliances and fuel-burning fireplaces.** Carbon monoxide detection shall be provided in *dwelling units, sleeping units* and classrooms that contain a fuel-burning appliance or a fuel-burning fireplace.

**915.1.3 Fuel-burning forced-air furnaces.** Carbon monoxide detection shall be provided in *dwelling units, sleeping units* and classrooms served by a fuel-burning, forced-air furnace.

**Exception:** Carbon monoxide detection shall not be required in *dwelling units, sleeping units* and classrooms where a carbon monoxide detector is provided in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an *approved* location.

**915.1.4 Fuel-burning appliances outside of dwelling units, sleeping units and classrooms.** Carbon monoxide detection shall be provided in *dwelling units, sleeping units* and classrooms located in buildings that contain fuel-burning appliances or fuel-burning fireplaces.

### **Exceptions:**

1. Carbon monoxide detection shall not be required in *dwelling units, sleeping units* and classrooms without communicating openings between the fuel-burning appliance or fuel-burning fireplace and the *dwelling unit, sleeping unit* or classroom.
2. Carbon monoxide detection shall not be required in *dwelling units, sleeping units* and classrooms where a carbon monoxide detector is provided in one of the following locations:
  - 2.1. In an *approved* location between the fuel-burning appliance or fuel-burning fireplace and the *dwelling unit, sleeping unit* or classroom.
  - 2.2. On the ceiling of the room containing the fuel-burning appliance or fuel-burning fireplace.

**915.1.5 Private garages.** Carbon monoxide detection shall be provided in *dwelling units, sleeping units* and classrooms in buildings with attached private garages.

### **Exceptions:**

1. Carbon monoxide detection shall not be required in *dwelling units, sleeping units* and classrooms without communicating openings between the private garage and the *dwelling unit, sleeping unit* or classroom.
2. Carbon monoxide detection shall not be required in *dwelling units, sleeping units* and classrooms located more than one story above or below a private garage.
3. Carbon monoxide detection shall not be required where the private garage connects to the building through an *open-ended corridor*.
4. Where a carbon monoxide detector is provided in an *approved* location between openings to a private garage and *dwelling units, sleeping units* or classrooms.

**915.1.6 Exempt garages.** For determining compliance with Section 915.1.5, an open parking garage complying with Section 406.5 of the *International Building Code* or an enclosed parking garage complying with Section 406.6 of the *International Building Code* shall not be considered a private garage.

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**915.2 Locations.** Where required by Section 915.1.1, carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.3.

**[W] 915.2.1 Dwelling units.** Carbon monoxide detection shall be installed in *dwelling units* outside of each separate sleeping area in the immediate vicinity of the bedrooms and on each level of the dwelling. Where a fuel-burning appliance or a fuel-burning fireplace is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.

**[W] 915.2.2 Sleeping units.** Carbon monoxide detection shall be installed in *sleeping units*.

**Exception:** Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a fuel-burning appliance or a fuel-burning fireplace and is not served by a forced-air furnace.

**[W] 915.2.3 Group E occupancies.** ~~((Carbon))~~ When required by Section 915.1 in new buildings, or by Chapter 11 of the International Fire Code, carbon monoxide ((detectors)) detection shall be installed in classrooms in Group E occupancies. Carbon monoxide alarm signals shall be automatically transmitted to an on-site location that is staffed by school personnel.

### Exceptions:

1. Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an *occupant load* of ~~((30))~~ 50 or less.
2. Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies where an exception contained in Section 915.1 applies, or in Group E occupancies where signals are transmitted to an off-site service monitored by a third party, such as a service that monitors fire protection systems in the building.

**915.3 Carbon monoxide detection.** Carbon monoxide detection required by Sections 915.1 through 915.2.3 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.

**915.4 Carbon monoxide alarms.** Carbon monoxide alarms shall comply with Sections 915.4.1 through 915.4.4.

**915.4.1 Power source.** Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

**Exception:** Where installed in buildings without commercial power, battery-powered carbon monoxide alarms shall be an acceptable alternative.

**915.4.2 Listings.** Carbon monoxide alarms shall be *listed* in accordance with UL 2034.

**915.4.3 Locations.** Carbon monoxide alarms shall only be installed in *dwelling units* and in *sleeping units*. They shall not be installed in locations where the code requires carbon monoxide detectors to be used.

**915.4.4 Combination alarms.** Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be *listed* in accordance with UL 217 and UL 2034.

**915.5 Carbon monoxide detection systems.** Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

**[W] 915.5.1 General.** Carbon monoxide detection systems shall comply with NFPA ~~((720))~~ 72. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

**[W] 915.5.2 Locations.** Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA ~~((720))~~ 72.

**915.5.3 Combination detectors.** Combination carbon monoxide/smoke detectors installed in carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide detectors, provided that they are *listed* in accordance with UL 268 and UL 2075.

**[W] 915.6 Maintenance.** Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA ~~((720))~~ 72. Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end-of-life signals shall be replaced.

**915.6.1 Enclosed parking garages.** Carbon monoxide and nitrogen dioxide detectors installed in enclosed parking garages in accordance with Section 404.1 of the *International Mechanical Code* shall be maintained in accordance with the manufacturer's instructions and their listing. Detectors that become inoperable or begin producing end-of-life signals shall be replaced.

## SECTION 1003 GENERAL MEANS OF EGRESS

**[BE] 1003.1 Applicability.** The general requirements specified in Sections 1003 through 1015 shall apply to all three elements of the *means of egress* system, in addition to those specific requirements for the *exit access*, the *exit* and the *exit discharge* detailed elsewhere in this chapter.

**[S][BE] 1003.2 Ceiling height.** The *means of egress* shall have a ceiling height of not less than 7 feet 6 inches (2286 mm) above the finished floor.

### Exceptions:

1. ~~((Sloped ceilings))~~ Ceilings in accordance with Section 1207.2 of the *International Building Code*.
- ~~((2. Ceilings of dwelling units and sleeping units within residential occupancies in accordance with Section 1207.2 of the International Building Code.~~
- 3) 2. Allowable projections in accordance with Section 1003.3.
- ~~((4))~~ 3. *Stair* headroom in accordance with Section 1011.3.
- ~~((5))~~ 4. Door height in accordance with Section 1010.1.1.
- ~~((6))~~ 5. *Ramp* headroom in accordance with Section 1012.5.2.
- ~~((7))~~ 6. The clear height of floor levels in vehicular and pedestrian traffic areas of public and private parking garages in accordance with Section 406.2.2 of the *International Building Code*.
- ~~((8))~~ 7. Areas above and below *mezzanine* floors in accordance with Section 505.2 of the *International Building Code*.

**[BE] 1003.3 Protruding objects.** Protruding objects on circulation paths shall comply with the requirements of Sections 1003.3.1 through 1003.3.4.

**[BE] 1003.3.1 Headroom.** Protruding objects are permitted to extend below the minimum ceiling height required by Section 1003.2 where a minimum headroom of 80 inches (2032 mm) is provided over any circulation paths, including walks, *corridors*, *aisles* and passageways. Not more than 50 percent of the ceiling area of a *means of egress* shall be reduced in height by protruding objects.

**Exception:** Door closers and stops shall not reduce headroom to less than 78 inches (1981 mm).

A barrier shall be provided where the vertical clearance above a circulation path is less than 80 inches (2032 mm) high above the finished floor. The leading edge of such a barrier shall be located 27 inches (686 mm) maximum above the finished floor.

**[BE] 1003.3.2 Post-mounted objects.** A free-standing object mounted on a post or pylon shall not overhang that post or pylon more than 4 inches (102 mm) where the lowest point of the leading edge is more than 27 inches (686 mm) and less than 80 inches (2032 mm) above the finished floor. Where a sign or other obstruction is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 12 inches (305 mm), the lowest edge of such sign or obstruction shall be 27 inches (686 mm) maximum or 80 inches (2032 mm) minimum above the finished floor or ground.

**Exception:** These requirements shall not apply to sloping portions of *handrails* between the top and bottom riser of *stairs* and above the *ramp* run.

**[BE] 1003.3.3 Horizontal projections.** Objects with leading edges more than 27 inches (685 mm) and not more than 80 inches (2030 mm) above the finished floor shall not project horizontally more than 4 inches (102 mm) into the circulation path.

**Exception:** *Handrails* are permitted to protrude 4-1/2 inches (114 mm) from the wall or guard.

**[BE] 1003.3.4 Clear width.** Protruding objects shall not reduce the minimum clear width of *accessible routes*.

**[BE] 1003.4 Slip-resistant surface.** Circulation paths of the *means of egress* shall have a slip-resistant surface and be securely attached.

**[S][BE] 1003.5 Elevation change.** Where changes in elevation of less than 12 inches (305 mm) exist in the *means of egress*, sloped surfaces shall be used. Where the slope is greater than 1 unit vertical in 20 units horizontal (5-percent slope), *ramps* complying with Section 1012 shall be used. Where the difference in elevation is 6 inches (152 mm) or less, the *ramp* shall be equipped with either *handrails* or floor finish materials that contrast with adjacent floor finish materials.

### Exceptions:

1. Steps at exterior doors complying with Section 1010.1.4.
2. A *stair* with a single riser or with two risers and a tread is permitted at locations not required to be *accessible* by Chapter 11 of the *International Building Code* ((~~§~~)) where: the stair is not within a stairway with two or more flights of stairs; the risers and treads comply with Section 1011.5; ~~((~~§~~))~~ the minimum depth of the tread is 13 inches (330

## MEANS OF EGRESS

mm) and not less than one *handrail* complying with Section 1014 is provided within 30 inches (762 mm) of the centerline of the normal path of egress travel on the *stair*.

3. A step is permitted in *aisles* serving seating that has a difference in elevation less than 12 inches (305 mm) at locations not required to be *accessible* by Chapter 11 of the *International Building Code*, provided that the risers and treads comply with Section 1030.14 and the *aisle* is provided with a *handrail* complying with Section 1030.16.

Throughout a story in a Group I-2 occupancy, any change in elevation in portions of the *means of egress* that serve nonambulatory persons shall be by means of a *ramp* or sloped walkway.

**[BE] 1003.6 Means of egress continuity.** The path of egress travel along a *means of egress* shall not be interrupted by a building element other than a *means of egress* component as specified in this chapter. Obstructions shall not be placed in the minimum width or required capacity of a *means of egress* component except projections permitted by this chapter. The minimum width or required capacity of a *means of egress* system shall not be diminished along the path of egress travel.

**[W][BE] 1003.7 Elevators, escalators and moving walks.** Elevators, escalators and moving walks shall not be used as a component of a required *means of egress* from any other part of the building.

### Exceptions:

1. Elevators used as an *accessible means of egress* in accordance with Section 1009.4.
2. Escalators used as a means of egress for fixed transit and passenger rail system accordance with Section 3116.

## SECTION 1004 OCCUPANT LOAD

**[BE] 1004.1 Design occupant load.** In determining *means of egress* requirements, the number of occupants for whom *means of egress* facilities are provided shall be determined in accordance with this section.

**[BE] 1004.2 Cumulative occupant loads.** Where the path of egress travel includes intervening rooms, areas or spaces, cumulative *occupant loads* shall be determined in accordance with this section.

**Interpretation I1004.1:** The occupant load factor for occupied roofs is 15 net unless the *construction documents* indicate use other than unconcentrated assembly.

**[BE] 1004.2.1 Intervening spaces or accessory areas.** Where occupants egress from one or more rooms, areas or spaces through others, the design *occupant load* shall be the combined *occupant load* of interconnected accessory or intervening spaces. Design of egress path capacity shall be based on the cumulative portion of *occupant loads* of all rooms, areas or spaces to that point along the path of egress travel.

**[BE] 1004.2.2 Adjacent levels for mezzanines.** That portion of the *occupant load* of a *mezzanine* with required egress through a room, area or space on an adjacent level shall be added to the *occupant load* of that room, area or space.

**[BE] 1004.2.3 Adjacent stories.** Other than for the egress components designed for convergence in accordance with Section 1005.6, the *occupant load* from separate stories shall not be added.

**[BE] 1004.3 Multiple-function occupant load.** Where an area under consideration contains multiple functions having different *occupant load* factors, the design *occupant load* for such area shall be based on the floor area of each function calculated independently.

**[BE] 1004.4 Multiple occupancies.** Where a building contains two or more occupancies, the *means of egress* requirements shall apply to each portion of the building based on the occupancy of that space. Where two or more occupancies utilize portions of the same *means of egress* system, those egress components shall meet the more stringent requirements of all occupancies that are served.

**[BE] 1004.5 Areas without fixed seating.** The number of occupants shall be computed at the rate of one occupant per unit of area as prescribed in Table 1004.5. For areas without *fixed seating*, the *occupant load* shall be not less than that number determined by dividing the floor area under consideration by the *occupant load* factor assigned to the function of the space as set forth in Table 1004.5. Where an intended function is not listed in Table 1004.5, the *fire code official* shall establish a function based on a listed function that most nearly resembles the intended function.

**Exception:** Where *approved* by the *fire code official*, the actual number of occupants for whom each occupied space, floor or building is designed, although less than those determined by calculation, shall be permitted to be used in the determination of the design *occupant load*.



[W][S][BE] TABLE 1004.5  
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR <sup>a</sup>
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
<u>Commercial laboratories</u>	<u>100 gross</u>
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops, <u>laboratories</u> and other vocational room areas	50 net
Exercise rooms	50 gross
<u>Fixed guideway transit and passenger rail systems</u>	
<u>Platform</u>	<u>See Section 4901.2</u>
<u>Concourse/lobby</u>	<u>100 gross</u>
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2 of the <i>International Building Code</i>
Mercantile	60 gross
<u>Art gallery</u>	<u>30 gross</u>
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross

**MEANS OF EGRESS**

**[W][S][BE] TABLE 1004.5—continued  
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT**

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR <sup>a</sup>
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 square foot = 0.0929 m<sup>2</sup>, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

b. For electrical equipment areas, see also Sections 110.26 and 110.32 through 110.34 of the Seattle Electrical Code.

**[BE] 1004.5.1 Increased occupant load.** The *occupant load* permitted in any building, or portion thereof, is permitted to be increased from that number established for the occupancies in Table 1004.5, provided that all other requirements of the code are met based on such modified number and the *occupant load* does not exceed one occupant per 7 square feet (0.65 m<sup>2</sup>) of occupiable floor space. Where required by the *fire code official*, an *approved aisle*, seating or fixed equipment diagram substantiating any increase in *occupant load* shall be submitted. Where required by the *fire code official*, such diagram shall be posted.

**[BE] 1004.6 Fixed seating.** For areas having fixed seats and *aisles*, the *occupant load* shall be determined by the number of fixed seats installed therein. The *occupant load* for areas in which *fixed seating* is not installed, such as waiting spaces, shall be determined in accordance with Section 1004.5 and added to the number of fixed seats.

The *occupant load* of wheelchair spaces and the associated companion seat shall be based on one occupant for each wheelchair space and one occupant for the associated companion seat provided in accordance with Section 1109.2.3 of the *International Building Code*.

For areas having fixed seating without dividing arms, the *occupant load* shall be not less than the number of seats based on one person for each 18 inches (457 mm) of seating length.

The *occupant load* of seating booths shall be based on one person for each 24 inches (610 mm) of booth seat length measured at the backrest of the seating booth.

**[BE] 1004.7 Outdoor areas.** *Yards*, patios, occupied roofs *courts* and similar outdoor areas accessible to and usable by the building occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *fire code official* in accordance with the anticipated use. Where outdoor areas are to be used by persons in addition to the occupants of the building, and the path of egress travel from the outdoor areas passes through the building, *means of egress* requirements for the building shall be based on the sum of the *occupant loads* of the building plus the outdoor areas.

**Exceptions:**

1. Outdoor areas used exclusively for service of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual *dwelling units* of Group R-2.

**[BE] 1004.8 Concentrated business use areas.** The *occupant load* factor for concentrated business use shall be applied to telephone call centers, trading floors, electronic data processing centers and similar business use areas with a higher density of occupants than would normally be expected in a typical business occupancy environment. Where *approved* by the code official, the *occupant load* for concentrated business use areas shall be the actual *occupant load*, but not less than one occupant per 50 square feet (4.65 m<sup>2</sup>) of gross occupiable floor space.

**[BE] 1004.9 Posting of occupant load.** Every room or space that is an assembly occupancy shall have the *occupant load* of the room or space posted in a conspicuous place, near the main *exit* or *exit access* doorway from the room or space, for the intended configurations. Posted signs shall be of an *approved* legible permanent design and shall be maintained by the *owner* or the *owner's* authorized agent.

**SECTION 1005  
MEANS OF EGRESS SIZING**

**[W][BE] 1005.1 General.** All portions of the *means of egress* system shall be sized in accordance with this section.

**Exceptions:**

1. *Aisles* and *aisle accessways* in rooms or spaces used for assembly purposes complying with Section 1030.
2. The capacity in inches, of means of egress components for fixed guideway transit and passenger rail stations, shall meet the requirements of Section 4901.2.

**[BE] 1005.2 Minimum width based on component.** The minimum width, in inches (mm), of any *means of egress* components shall be not less than that specified for such component, elsewhere in this code.

**[S][BE] 1005.3 Required capacity based on occupant load.** The required capacity, in inches (mm), of the *means of egress* for any room, area, space or story shall be not less than that determined in accordance with Sections 1005.3.1 and 1005.3.2. The width at any point in the path of egress travel shall not be less than the width required for doors in Section 1010.

**Exceptions:**

1. *Aisles and aisle accessways complying with Section 1018.*
2. *Corridors complying with Section 1020.2.*
3. *Stage stairways and catwalks complying with Section 410.6 of the International Building Code.*

**[BE] 1005.3.1 Stairways.** The capacity, in inches, of *means of egress stairways* shall be calculated by multiplying the *occupant load* served by such *stairways* by a means of egress capacity factor of 0.3 inch (7.6 mm) per occupant. Where *stairways* serve more than one story, only the *occupant load* of each story considered individually shall be used in calculating the required capacity of the *stairways* serving that story.

**Exceptions:**

1. For other than Group H and I-2 occupancies, the capacity, in inches, of *means of egress stairways* shall be calculated by multiplying the *occupant load* served by such *stairways* by a *means of egress* capacity factor of 0.2 inch (5.1 mm) per occupant in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.
2. Facilities with *smoke-protected assembly seating* shall be permitted to use the capacity factors in Table 1030.6.2 indicated for stepped *aisles* for *exit access* or *exit stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is provided with a smoke control system complying with Section 909.
3. Facilities with *open-air assembly seating* shall be permitted to the capacity factors in Section 1030.6.3 indicated for stepped *aisles* for *exit access* or *exit stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is open to the outdoors.

**[BE] 1005.3.2 Other egress components.** The capacity, in inches, of *means of egress* components other than *stairways* shall be calculated by multiplying the *occupant load* served by such component by a *means of egress* capacity factor of 0.2 inch (5.1 mm) per occupant.

**Exceptions:**

1. For other than Group H and I-2 occupancies, the capacity, in inches, of *means of egress* components other than *stairways* shall be calculated by multiplying the *occupant load* served by such component by a *means of egress* capacity factor of 0.15 inch (3.8 mm) per occupant in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.
2. Facilities with *smoke-protected assembly seating* shall be permitted to use the capacity factors in Table 1030.6.2 indicated for level or ramped *aisles* for *means of egress* components other than *stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is provided with a smoke control system complying with Section 909.
3. Facilities with *open-air assembly seating* shall be permitted to the capacity factors in Section 1030.6.3 indicated for level or ramped *aisles* for *means of egress* components other than *stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is open to the outdoors.

**[BE] 1005.4 Continuity.** The minimum width or required capacity of the *means of egress* required from any story of a building shall not be reduced along the path of egress travel until arrival at the *public way*.

**[BE] 1005.5 Distribution of minimum width and required capacity.** Where more than one *exit*, or access to more than one *exit*, is required, the *means of egress* shall be configured such that the loss of any one *exit*, or access to one *exit*, shall not reduce the available capacity or width to less than 50 percent of the required capacity or width.

**[S][BE] 1005.6 Egress convergence.** Where the *means of egress* from stories above and below converge at an intermediate level, the capacity of the *means of egress* from the point of convergence shall be not less than the largest minimum width or the sum of the required capacities for the *stairways* or *ramps* serving the two adjacent stories, whichever is larger.

**Exception:** The capacity necessary for parking uses need not be considered.

**[BE] 1005.7 Encroachment.** Encroachments into the required *means of egress* width shall be in accordance with the provisions of this section.

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**[BE] 1005.7.1 Doors.** Doors, when fully opened, shall not reduce the required width by more than 7 inches (178 mm). Doors in any position shall not reduce the required width by more than one-half.

### Exceptions:

1. Surface-mounted latch release hardware shall be exempt from inclusion in the 7-inch maximum (178 mm) encroachment where both of the following conditions exist:
  - 1.1. The hardware is mounted to the side of the door facing away from the adjacent wall where the door is in the open position.
  - 1.2. The hardware is mounted not less than 34 inches (865 mm) nor more than 48 inches (1219 mm) above the finished floor.
2. The restrictions on door swing shall not apply to doors within individual *dwelling units* and *sleeping units* of Group R-2 occupancies and *dwelling units* of Group R-3 occupancies.

**[BE] 1005.7.2 Other projections.** *Handrail* projections shall be in accordance with the provisions of Section 1014.8. Other nonstructural projections such as trim and similar decorative features shall be permitted to project into the required width not more than 1-1/2 inches (38 mm) on each side.

**Exception:** Projections are permitted in *corridors* within Group I-2, Condition 1 in accordance with Section 407.4.3 of the *International Building Code*.

**[BE] 1005.7.3 Protruding objects.** Protruding objects shall comply with the applicable requirements of Section 1003.3.

## SECTION 1006 NUMBERS OF EXITS AND EXIT ACCESS DOORWAYS

**[BE] 1006.1 General.** The number of *exits* or *exit access doorways* required within the *means of egress* system shall comply with the provisions of Section 1006.2 for spaces, including *mezzanines*, and Section 1006.3 for *stories* or occupied roofs.

**[BE] 1006.2 Egress from spaces.** Rooms, areas or spaces, including *mezzanines*, within a story or *basement* shall be provided with the number of *exits* or access to *exits* in accordance with this section.

**[W][BE] 1006.2.1 Egress based on occupant load and common path of egress travel distance.** Two *exits* or *exit access doorways* from any space shall be provided where the design *occupant load* or the *common path of egress travel* distance exceeds the values listed in Table 1006.2.1. The cumulative *occupant load* from adjacent rooms, areas or spaces shall be determined in accordance with Section 1004.2.

### Exceptions:

1. The number of *exits* from foyers, lobbies, vestibules or similar spaces need not be based on cumulative occupant loads for areas discharging through such spaces, but the capacity of the *exits* from such spaces shall be based on applicable cumulative occupant loads.
2. Care suites in Group I-2 occupancies complying with Section 407.4 of the *International Building Code*.
3. Unoccupied mechanical rooms and penthouses are not required to comply with the *common path of egress travel* distance measurement.
4. The common path of travel for fixed transit and passenger rail system stations shall be in accordance with Section 4901.2.

[W][BE] TABLE 1006.2.1  
SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without Sprinkler System (feet)		With Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A <sup>c</sup> , E, M <sup>h</sup>	49	75	75	75 <sup>a</sup>
B	49	100	75	100 <sup>a</sup>
F	49	75	75	100 <sup>a</sup>
H-1, H-2, H-3	3	NP	NP	25 <sup>b</sup>
H-4, H-5	10	NP	NP	75 <sup>b</sup>
I-1, I-2 <sup>d</sup> , I-4	10	NP	NP	75 <sup>a</sup>
I-3	10	NP	NP	100 <sup>a</sup>
R-1	10	NP	NP	75 <sup>a</sup>
R-2	20	NP	NP	125 <sup>a</sup>
R-3 <sup>e</sup>	20	NP	NP	125 <sup>a, g</sup>
R-4 <sup>e</sup>	20	NP	NP	125 <sup>a, g</sup>
S <sup>f</sup>	29	100	75	100 <sup>a</sup>
U	49	100	75	75 <sup>a</sup>

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

- a. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.
- b. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.
- c. For a room or space used for assembly purposes having fixed seating, see Section 1030.8.
- d. For the travel distance limitations in Group I-2, see Section 407.4 of the *International Building Code*.
- e. The common path of egress travel distance shall apply only in a Group R-3 occupancy located in a mixed occupancy building.
- f. The length of common path of egress travel distance in a Group S-2 open parking garage shall be not more than 100 feet.
- g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3, see Section 1006.2.2.6.
- h. Day care facilities, rooms or spaces where care is provided for more than 10 children that are 2-1/2 years of age or less shall have access to not less than two exit access doorways.

[W][BE] 1006.2.1.1 **Three or more exits or exit access doorways.** Three *exits* or *exit access doorways* shall be provided from any space with an *occupant load* of 501 to 1,000. Four *exits* or *exit access doorways* shall be provided from any space with an *occupant load* greater than 1,000.

**Exception:** The number of required exits for fixed transit and passenger rail systems may be reduced by one at open stations.

[BE] 1006.2.2 **Egress based on use.** The numbers, configuration and types of components of *exits* or access to *exits* shall be provided in the uses described in Sections 1006.2.2.1 through 1006.2.2.6.

[BE] 1006.2.2.1 **Boiler, incinerator and furnace rooms.** Two *exit access doorways* are required in boiler, incinerator and furnace rooms where the area is over 500 square feet (46 m<sup>2</sup>) and any fuel-fired equipment exceeds 400,000 British thermal units (Btu) (422 000 KJ) input capacity. Where two *exit access doorways* are required, one is permitted to be a fixed ladder or an *alternating tread device*. *Exit access doorways* shall be separated by a horizontal distance equal to one-half the length of the maximum overall diagonal dimension of the room.

[BE] 1006.2.2.2 **Refrigeration machinery rooms.** Machinery rooms larger than 1,000 square feet (93 m<sup>2</sup>) shall have not less than two *exits* or *exit access doorways*. Where two *exit access doorways* are required, one such doorway is permitted to be served by a fixed ladder or an *alternating tread device*. *Exit access doorways* shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of the room.

All portions of machinery rooms shall be within 150 feet (45 720 mm) of an *exit* or *exit access doorway*. An increase in *exit access* travel distance is permitted in accordance with Section 1017.1.

*Exit* and *exit access doorways* shall swing in the direction of egress travel and shall be equipped with panic hardware, regardless of the *occupant load* served. *Exit* and *exit access doorways* shall be tight fitting and self-closing.

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**[BE] 1006.2.2.3 Refrigerated rooms or spaces.** Rooms or spaces having a floor area larger than 1,000 square feet (93 m<sup>2</sup>), containing a refrigerant evaporator and maintained at a temperature below 68°F (20°C), shall have access to not less than two *exits* or *exit access doorways*.

*Exit access* travel distance shall be determined as specified in Section 1017.1, but all portions of a refrigerated room or space shall be within 150 feet (45 720 mm) of an *exit* or *exit access doorway* where such rooms are not protected by an *approved automatic sprinkler system*. Egress is allowed through adjoining refrigerated rooms or spaces.

**Exception:** Where using refrigerants in quantities limited to the amounts based on the volume set forth in the *International Mechanical Code*.

**[BE] 1006.2.2.4 Electrical rooms.** The location and number of *exit* or *exit access doorways* shall be provided for electrical rooms in accordance with Section 110.26 of (~~NFPA 70~~) the Seattle Electrical Code for electrical equipment rated 1,000 volts or less, and Section 110.33 of (~~NFPA 70~~) the Seattle Electrical Code for electrical equipment rated over 1,000 volts. Panic hardware shall be provided where required in accordance with Section 1010.2.9.2.

**Note:** See *Seattle Electrical Code* Sections 110.26.C.2 and 110.33.A.1 for conditions where two exits shall be provided from required working space containing large equipment.

**[BE] 1006.2.2.5 Vehicular ramps.** Vehicular *ramps* shall not be considered as an *exit access ramp* unless pedestrian facilities are provided.

**[BE] 1006.2.2.6 Groups R-3 and R-4.** Where Group R-3 occupancies are permitted by Section 903.2.8 to be protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.3, the *exit access* travel distance for Group R-3 shall be not more than 125 feet (38 100 mm). Where Group R-4 occupancies are permitted by Section 903.2.8 to be protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.3, the *exit access* travel distance for Group R-4 shall be not more than 75 feet (22 860 mm).

**[S][BE] 1006.3 Egress from stories or occupied roofs.** The *means of egress* system serving any *story* or occupied roof shall be provided with the number of separate and distinct *exits* or access to *exits* based on the aggregate *occupant load* served in accordance with this section. Horizontal exits shall not count toward the required number of exits from the story or roof.

**[BE] 1006.3.1 Occupant load.** Where *stairways* serve more than one *story*, or more than one *story* and an occupied roof, only the *occupant load* of each *story* or occupied roof, considered individually, shall be used when calculating the required number of *exits* or access to *exits* serving that *story*.

**[BE] 1006.3.2 Path of egress travel.** The path of egress travel to an *exit* shall not pass through more than one adjacent *story*.

**Exception:** The path of egress travel to an *exit* shall be permitted to pass through more than one adjacent *story* in any of the following:

1. In Group R-1, R-2 or R-3 occupancies, *exit access stairways* and *ramps* connecting four stories or fewer serving and contained within an individual dwelling unit or *sleeping unit* or live/work unit.
2. *Exit access stairways* serving and contained within a Group R-3 congregate residence or a Group R-4 facility.
3. *Exit access stairways* and *ramps* within an atrium complying with Section 404 of the *International Building Code*.
4. *Exit access stairways* and *ramps* in open parking garages that serve only the parking garage.
5. *Exit access stairways* and *ramps* serving open-air assembly seating complying with the *exit access* travel distance requirements of Section 1030.7.
6. *Exit access stairways* and *ramps* between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.
7. Exterior *exit access stairways* and *ramps* between occupied roofs.

**[BE] 1006.3.3 Egress based on occupant load.** Each *story* and occupied roof shall have the minimum number of separate and distinct *exits*, or access to *exits*, as specified in Table 1006.3.3. A single *exit* or access to a single *exit* shall be permitted in accordance with Section 1006.3.4. The required number of *exits*, or *exit access stairways* or *ramps* providing access to *exits*, from any *story* or occupied roof shall be maintained until arrival at the *exit discharge* or *public way*.

**[BE] TABLE 1006.3.3  
MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS PER STORY**

OCCUPANT LOAD PER STORY	MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS FROM STORY
1-500	2
501-1,000	3
More than 1,000	4

**[W][S][BE] 1006.3.4 Single exits.** A single *exit* or access to a single *exit* shall be permitted from any story or occupied roof, where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and *exit access* travel distance within the portion of the building served by the single exit do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
  - 5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one means of egress.
  - 5.2. Either the *exit* from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit* access outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.
6. Occupied roofs with an occupant load of ten or less are permitted to have a single exit or access to a single exit.
7. Not more than five stories of Group R-2 occupancy are permitted to be served by a single exit where all of the following conditions are present:
  - 7.1. The building has not more than six stories above grade plane.
  - 7.2. The building does not contain a boarding house.
  - 7.3. There shall be no more than four dwelling units on any floor.
  - 7.4. The building shall be of not less than one hour fire-resistive construction and shall also be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Residential-type sprinklers shall be used in all habitable spaces in each dwelling unit.
  - 7.5. There shall be no more than two single exit stairway conditions on the same property.
  - 7.6. An exterior stairway or interior exit stairway shall be provided. The interior exit stairway, including any related exit passageway, shall be pressurized in accordance with the Seattle Building Code. Doors in the stairway shall swing into the interior exit stairway regardless of the occupant load served, provided that doors from the interior exit stairway to the building exterior are permitted to swing in the direction of exit travel.
  - 7.7. A corridor shall separate each dwelling unit entry/exit door from the door to an interior exit stairway, including any related exit passageway, on each floor. Dwelling unit doors shall not open directly into an interior exit stairway. Dwelling unit doors are permitted to open directly into an exterior stairway.
  - 7.8. There shall be no more than 20 feet (6096 mm) of travel to the exit stairway from the entry/exit door of any dwelling unit.
  - 7.9. Travel distance measured in accordance with Section 1017 shall not exceed 125 feet (38 100 mm).
  - 7.10. The exit shall not terminate in an egress court where the court depth exceeds the court width unless it is possible to exit in either direction to the public way.
  - 7.11. Elevator hoistways shall be pressurized in accordance with Section 909.21 of the Seattle Building Code or shall open into elevator lobbies that comply with Section 713.14 of the Seattle Building Code. Where *approved* by the *building official*, natural ventilation is permitted to be substituted for pressurization where the ventilation would prevent the accumulation of smoke or toxic gases.
  - 7.12. Other occupancies are permitted in the same building provided they comply with all the requirements of the Seattle Building Code. Other occupancies shall not communicate with Group R occupancy portion of the building or with the single-exit stairway.

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**Exception:** Parking garages accessory to the Group R occupancy are permitted to communicate with the exit stairway.

- 7.13. The exit serving the Group R occupancy shall not discharge through any other occupancy, including an accessory parking garage.
- 7.14. There shall be no openings within 10 feet (3048 mm) of unprotected openings into the stairway other than required exit doors having a one-hour fire-resistance rating.

**[BE] TABLE 1006.3.4(1)  
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES**

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane	R-2 <sup>a, b</sup>	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

- a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.
- b. This table is used for R-2 occupancies consisting of dwelling units. For R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

**[BE] TABLE 1006.3.4(2)  
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES**

STORY	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane	A, B <sup>b</sup> , E, F <sup>b</sup> , M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2 <sup>a, c</sup>	10	75
	S <sup>b, d</sup>	29	75
Second story above grade plane	B, F, M, S <sup>d</sup>	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

- a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.
- b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum exit access travel distance of 100 feet.
- c. This table is used for R-2 occupancies consisting of sleeping units. For R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).
- d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

**[BE] 1006.3.4.1 Mixed occupancies.** Where one *exit*, or *exit access stairway* or *ramp* providing access to *exits* at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each story of a mixed occupancy building, the maximum number of occupants served by a single *exit* shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.4(2) for each occupancy does not exceed one. Where *dwelling units* are located on a story with other occupancies, the actual number of *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

**SECTION 1007  
EXIT AND EXIT ACCESS DOORWAY CONFIGURATION**

**[S][BE] 1007.1 General.** *Exits*, *exit access doorways*, and *exit access stairways* and *ramps* serving spaces, including individual building stories, shall be separated in accordance with the provisions of this section. Interlocking or scissor stairs and stairways that share a wall with other interior exit stairways shall be counted as one exit or exit access.

**[S][BE] 1007.1.1 Two exits or exit access doorways.** Where two *exits*, *exit access doorways*, *exit access stairways* or *ramps*, or any combination thereof, are required from any portion of the *exit access*, they shall be placed a distance apart



equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between them. (~~Interlocking or scissor stairways shall be counted as one exit stairway.~~)

**Exceptions:**

1. Where *interior exit stairways* or *ramps* are interconnected by a 1-hour *fire-resistance-rated corridor* conforming to the requirements of Section 1020, the required exit separation shall be measured along the shortest direct line of travel within the *corridor*.
2. Where a building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance shall be not less than one-third of the length of the maximum overall diagonal dimension of the area served.
3. Where it is not practical to separate exits by one-half the diagonal dimension, exits from retail and office tenant spaces in Group B and M occupancies and within dwelling units shall be as far apart as reasonably practicable as determined by the building official.

**[S][BE] 1007.1.1.1 Measurement point.** The separation distance required in Section 1007.1.1 shall be measured in accordance with the following:

1. The separation distance to *exit* or *exit access doorways* shall be measured to any point along the width of the doorway.
2. The separation distance to *exit access stairways* shall be measured to any point along the width of the closest riser.
3. The separation distance to *exit access ramps* shall be measured to any point along the width of the start of the ramp run.

**[BE] 1007.1.2 Three or more exits or exit access doorways.** Where access to three or more *exits* is required, not less than two *exit* or *exit access doorways* shall be arranged in accordance with the provisions of Section 1007.1.1. Additional required *exit* or *exit access doorways* shall be arranged a reasonable distance apart so that if one becomes blocked, the others will be available.

**[BE] 1007.1.3 Remoteness of exit access stairways or ramps.** Where two *exit access stairways* or *ramps* provide the required *means of egress* to *exits* at another story, the required separation distance shall be maintained for all portions of such *exit access stairways* or *ramps*.

**[BE] 1007.1.3.1 Three or more exit access stairways or ramps.** Where more than two *exit access stairways* or *ramps* provide the required *means of egress*, not less than two shall be arranged in accordance with Section 1007.1.3.

## SECTION 1008 MEANS OF EGRESS ILLUMINATION

**[S][BE] 1008.1 Means of egress illumination.** Illumination shall be provided at every point in the *means of egress* in accordance with Section 1008.2. Under emergency power, *means of egress* illumination shall comply with Section 1008.3.

**[BE] 1008.2 Illumination required.** The *means of egress* serving a room or space shall be illuminated at all times that the room or space is occupied.

**Exceptions:**

1. Occupancies in Group U.
2. *Aisle accessways* in Group A.
3. *Dwelling units* and *sleeping units* in Groups R-1, R-2 and R-3.
4. *Sleeping units* of Group I occupancies.

**[S][BE] 1008.2.1 Illumination level under normal power.** The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, *exit stairways* and at their required landings, the illumination level shall be not less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use. Luminaires shall be installed whenever exit signs are required by Section 1013.

**Exception:** For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' fire alarm system:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

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[BE] **1008.2.2 Group I-2.** In Group I-2 occupancies where two or more *exits* are required, on the exterior landings required by Section 1010.1.5, *means of egress* illumination levels for the *exit discharge* shall be provided such that failure of a single lamp in a luminaire shall not reduce the illumination level on that landing to less than 1 footcandle (11 lux).

[W][BE] ~~((1008.2.3 Exit discharge. Illumination shall be provided along the path of travel for the *exit discharge* from each *exit* to the *public way*.~~

~~**Exception:** Illumination shall not be required where the path of the *exit discharge* meets both of the following requirements:~~

- ~~1. The path of *exit discharge* is illuminated from the exit to a safe dispersal area complying with Section 1028.5.~~
- ~~2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.)~~

[S][BE] **1008.3 ((Emergency power)) Power supply for illumination.** The power supply for *means of egress* illumination shall normally be provided by the premises' electrical supply.

[S][BE] **1008.3.1 General.** In the event of power supply failure in rooms and spaces that require two or more *exits* or *access to exits*, an emergency ((electrical)) power system shall automatically illuminate all of the following areas:

1. *Aisles*.
2. *Corridors*.
3. *Exit access stairways and ramps*.

[BE] **1008.3.2 Buildings.** In the event of power supply failure, in buildings that require two or more *exits* or *access to exits*, an emergency electrical system shall automatically illuminate all of the following areas:

1. *Interior exit access stairways and ramps*.
2. *Interior and exterior exit stairways and ramps*.
3. *Exit passageways*.
4. Vestibules and areas on the *level of discharge* used for *exit discharge* in accordance with Section 1028.2.
5. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.

[BE] **1008.3.3 Rooms and spaces.** In the event of power supply failure, an emergency electrical system shall automatically illuminate all of the following areas:

1. Electrical equipment rooms.
2. *Fire command centers*.
3. Fire pump rooms.
4. Generator rooms.
5. Public restrooms with an area greater than 300 square feet (27.87 m<sup>2</sup>).

[BE] **1008.3.4 Duration.** The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 2702 of the *International Building Code*.

[BE] **1008.3.5 Illumination level under emergency power.** Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at floor level. Illumination levels shall be permitted to decline to 0.6 footcandle (6 lux) average and a minimum at any point of 0.06 footcandle (0.6 lux) at the end of the emergency lighting time duration. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded. In Group I-2 occupancies, failure of a single lamp in a luminaire shall not reduce the illumination level to less than 0.2 footcandle (2.2 lux).

## SECTION 1009 ACCESSIBLE MEANS OF EGRESS

[W][BE] **1009.1 Accessible means of egress required.** *Accessible means of egress* shall comply with this section. Accessible spaces shall be provided with not less than one *accessible means of egress*. Where more than one *means of egress* is required by Section 1006.2 or 1006.3 from any accessible space, each accessible portion of the space shall be served by not less than two *accessible means of egress*.

### Exceptions:

1. Accessible means of egress are not required to be provided in existing buildings.
- (+) 2. One *accessible means of egress* is required from an accessible *mezzanine* level in accordance with Section 1009.3, 1009.4 or 1009.5.

((2)) 3. In assembly areas with ramped *aisles* or stepped *aisles*, one *accessible means of egress* is permitted where the common path of travel is accessible and meets the requirements in Section 1030.8.

4. In parking garages, accessible means of egress are not required to serve parking areas that do not contain accessible parking spaces.

**[BE] 1009.2 Continuity and components.** Each required *accessible means of egress* shall be continuous to a *public way* and shall consist of one or more of the following components:

1. *Accessible routes* complying with Section 1104 of the *International Building Code*.
2. *Interior exit stairways* complying with Sections 1009.3 and 1023.
3. *Exit access stairways* complying with Sections 1009.3 and 1019.3 or 1019.4.
4. *Exterior exit stairways* complying with Sections 1009.3 and 1027 and serving levels other than the *level of exit discharge*.
5. Elevators complying with Section 1009.4.
6. Platform lifts complying with Section 1009.5.
7. *Horizontal exits* complying with Section 1026.
8. *Ramps* complying with Section 1012.
9. *Areas of refuge* complying with Section 1009.6.
10. Exterior areas for assisted rescue complying with Section 1009.7 serving *exits* at the *level of exit discharge*.

**[W][BE] 1009.2.1 Elevators required.** In buildings where a required accessible floor or accessible occupied roof is four or more stories above or below a *level of exit discharge*, not less than one required *accessible means of egress* shall be an elevator complying with Section 1009.4.

**Exceptions:**

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *ramp* conforming to the provisions of Section 1012.

**[BE] 1009.3 Stairways.** In order to be considered part of an *accessible means of egress*, a *stairway* between stories shall comply with Sections 1009.3.1 through 1009.3.3.

**[BE] 1009.3.1 Exit access stairways.** *Exit access stairways* that connect levels in the same *story* are not permitted as part of an *accessible means of egress*.

**Exception:** *Exit access stairways* providing *means of egress* from mezzanines are permitted as part of an *accessible means of egress*.

**[BE] 1009.3.2 Stairway width.** *Stairways* shall have a clear width of 48 inches (1219 mm) minimum between *handrails*.

**Exceptions:**

1. The clear width of 48 inches (1219 mm) between *handrails* is not required in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
2. The clear width of 48 inches (1219 mm) between *handrails* is not required for *stairways* accessed from a refuge area in conjunction with a *horizontal exit*.

**[BE] 1009.3.3 Area of refuge.** *Stairways* shall either incorporate an *area of refuge* within an enlarged floor-level landing or shall be accessed from an *area of refuge* complying with Section 1009.6.

**Exceptions:**

1. *Areas of refuge* are not required at *exit access stairways* where two-way communication is provided at the elevator landing in accordance with Section 1009.8.
2. *Areas of refuge* are not required at *stairways* in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. *Areas of refuge* are not required at *stairways* serving *open parking garages*.
4. *Areas of refuge* are not required for *smoke-protected* or *open-air assembly seating* areas complying with Sections 1030.6.2 and 1030.6.3.
5. *Areas of refuge* are not required at *stairways* in Group R-2 occupancies.

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6. *Areas of refuge* are not required for *stairways* accessed from a refuge area in conjunction with a *horizontal exit*.

**[BE] 1009.4 Elevators.** In order to be considered part of an accessible *means of egress*, an elevator shall comply with Sections 1009.4.1 and 1009.4.2.

**[S][BE] 1009.4.1 Standby power.** The elevator shall meet the emergency operation and signaling device requirements of Section 2.27 of ASME A17.1/CSA B44. ~~((Standby))~~ An emergency or legally required standby power system shall be provided in accordance with Chapter 27 ((and Section 3003)) of the *International Building Code* and the *Seattle Electrical Code* for the operation of the elevator, the shunt trip and lighting for elevator cars, control rooms, machine rooms, and machinery spaces.

**[BE] 1009.4.2 Area of refuge.** The elevator shall be accessed from an *area of refuge* complying with Section 1009.6.

### Exceptions:

1. *Areas of refuge* are not required at the elevator in open parking garages.
2. *Areas of refuge* are not required in buildings and facilities equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. *Areas of refuge* are not required at elevators not required to be located in a shaft in accordance with Section 712 of the *International Building Code*.
4. *Areas of refuge* are not required at elevators serving *smoke protected or open-air assembly seating areas* complying with Sections 1030.6.2 and 1030.6.3.
5. *Areas of refuge* are not required for elevators accessed from a refuge area in conjunction with a *horizontal exit*.

**[S][BE] 1009.5 Platform lifts.** Platform lifts shall be permitted to serve as part of an *accessible means of egress* where allowed as part of a required *accessible route* in Section 1110.9 of the *International Building Code* except for Item 10. ~~((Standby))~~ A legally required standby power system for the platform lift shall be provided in accordance with Chapter 27 of the *International Building Code*.

**[BE] 1009.6 Areas of refuge.** Every required *area of refuge* shall be accessible from the space it serves by an *accessible means of egress*.

**[BE] 1009.6.1 Travel distance.** The maximum travel distance from any accessible space to an *area of refuge* shall not exceed the *exit access* travel distance permitted for the occupancy in accordance with Section 1017.1.

**[BE] 1009.6.2 Stairway or elevator access.** Every required *area of refuge* shall have direct access to a *stairway* complying with Sections 1009.3 and 1023 or an elevator complying with Section 1009.4.

**Exception:** An interior *area of refuge* at the *level of exit discharge* that provides direct access to an exterior exit door.

**[BE] 1009.6.3 Size.** Each *area of refuge* shall be sized to accommodate one wheelchair space of 30 inches by 52 inches (762 mm by 1321 mm) for each 200 occupants or portion thereof, based on the *occupant load* of the *area of refuge* and areas served by the *area of refuge*. Such wheelchair spaces shall not reduce the *means of egress* minimum width or required capacity. Access to any of the required wheelchair spaces in an *area of refuge* shall not be obstructed by more than one adjoining wheelchair space.

**[BE] 1009.6.4 Separation.** Each *area of refuge* shall be separated from the remainder of the story by a *smoke barrier* complying with Section 709 of the *International Building Code* or a *horizontal exit* complying with Section 1026. Each *area of refuge* shall be designed to minimize the intrusion of smoke.

### Exceptions:

1. *Areas of refuge* located within an enclosure for *interior exit stairways* complying with Section 1023.
2. *Areas of refuge* in outdoor facilities where *exit access* is essentially open to the outside.

**[BE] 1009.6.5 Two-way communication.** *Areas of refuge* shall be provided with a two-way communication system complying with Sections 1009.8.1 and 1009.8.2.

**[BE] 1009.7 Exterior areas for assisted rescue.** Exterior areas for assisted rescue shall be accessed by an *accessible route* from the area served.

Where the *exit discharge* does not include an *accessible route* from an *exit* located on the *level of exit discharge* to a *public way*, an exterior area of assisted rescue shall be provided on the exterior landing in accordance with Sections 1009.7.1 through 1009.7.4.

**[BE] 1009.7.1 Size.** Each exterior area for assisted rescue shall be sized to accommodate wheelchair spaces in accordance with Section 1009.6.3.

**[BE] 1009.7.2 Separation.** *Exterior walls* separating the exterior area of assisted rescue from the interior of the building shall have a minimum *fire-resistance rating* of 1 hour, rated for exposure to fire from the inside. The *fire-resistance-rated exterior wall* construction shall extend horizontally not less than 10 feet (3048 mm) beyond the landing on either side of the

landing or equivalent *fire-resistance-rated* construction is permitted to extend out perpendicular to the *exterior wall* not less than 4 feet (1219 mm) on the side of the landing. The *fire-resistance-rated* construction shall extend vertically from the ground to a point not less than 10 feet (3048 mm) above the floor level of the area for assisted rescue or to the roof line, whichever is lower. Openings within such *fire-resistance-rated exterior walls* shall be protected in accordance with Section 716 of the *International Building Code*.

**Exception:** The *fire-resistance rating* and opening protectives are not required in the exterior wall where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

**[BE] 1009.7.3 Openness.** The exterior area for assisted rescue shall be open to the outside air. The sides other than the separation walls shall be not less than 50 percent open, and the open area shall be distributed so as to minimize the accumulation of smoke or toxic gases.

**[BE] 1009.7.4 Stairways.** *Stairways* that are part of the *means of egress* for the exterior area for assisted rescue shall provide a minimum clear width of 48 inches (1219 mm) between *handrails*.

**Exception:** The minimum clear width of 48 inches (1219 mm) between *handrails* is not required at *stairways* serving buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

**[W][S][BE] 1009.8 Two-way communication.** A two-way communication system complying with Sections 1009.8.1 and 1009.8.2 shall be provided at the landing serving each elevator or bank of elevators on each accessible floor that is one or more stories above or below the *level of exit discharge*.

**Exceptions:**

1. Two-way communication systems are not required at the landing serving each elevator or bank of elevators where the two-way communication system is provided within *areas of refuge* in accordance with Section 1009.6.5.
2. Two-way communication systems are not required on floors provided with *ramps* conforming to the provisions of Section 1012.
3. Two-way communication systems are not required at the landings serving only service elevators that are not designated as part of the *accessible means of egress* or serve as part of the required *accessible route* into a facility.
4. Two-way communication systems are not required at the landings serving only freight elevators.
5. Two-way communication systems are not required at the landing serving a private residence elevator.
6. Two-way communication systems are not required in Group I-2 or I-3 facilities.

**[W][BE] 1009.8.1 System requirements.** Two-way communication systems shall provide communication between each required location and the *fire command center* or a central control point location *approved* by the fire department. Where the central control point is not a constantly attended location, the two-way communication system shall have a timed automatic telephone dial-out capability that provides two-way communication with an *approved* supervising station. ~~((or 9-1-1))~~ The two-way communication system shall include both audible and visible signals. The two-way communication system shall have a battery backup or an approved alternate source of power that is capable of 90 minutes' use upon failure of the normal power source.

**[BE] 1009.8.2 Directions.** Directions for the use of the two-way communication system, instructions for summoning assistance via the two-way communication system and written identification of the location shall be posted adjacent to the two-way communication system. Signage shall comply with the ICC A117.1 requirements for visual characters.

**[BE] 1009.9 Signage.** Signage indicating special accessibility provisions shall be provided as shown:

1. Each door providing access to an *area of refuge* from an adjacent floor area shall be identified by a sign stating: "AREA OF REFUGE."
2. Each door providing access to an exterior area for assisted rescue shall be identified by a sign stating: "EXTERIOR AREA FOR ASSISTED RESCUE."

Signage shall comply with the ICC A117.1 requirements for visual characters and include the International Symbol of Accessibility. Where exit sign illumination is required by Section 1013.3, the signs shall be illuminated. Additionally, visual characters, raised character and braille signage complying with ICC A117.1 shall be located at each door to an *area of refuge* and exterior area for assisted rescue in accordance with Section 1013.4.

**[BE] 1009.10 Directional signage.** Directional signage indicating the location of all other *means of egress* and which of those are *accessible means of egress* shall be provided at the following:

1. At *exits* serving a required accessible space but not providing an *approved accessible means of egress*.
2. At elevator landings.
3. Within *areas of refuge*.

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**[BE] 1009.11 Instructions.** In *areas of refuge* and exterior areas for assisted rescue, instructions on the use of the area under emergency conditions shall be posted. Signage shall comply with the ICC A117.1 requirements for visual characters. The instructions shall include all of the following:

1. Persons able to use the *exit stairway* do so as soon as possible, unless they are assisting others.
2. Information on planned availability of assistance in the use of *stairs* or supervised operation of elevators and how to summon such assistance.
3. Directions for use of the two-way communication system where provided.

## SECTION 1010 DOORS, GATES AND TURNSTILES

**[S][BE] 1010.1 Doors.** Doors in the *means of egress* shall comply with the requirements of Sections 1010.1.1 through 1010.3.4. Exterior exit doors shall also comply with the requirements of Section 1022.2. Gates in the *means of egress* shall comply with the requirements of Sections 1010.4 and 1010.4.1. Turnstiles in the *means of egress* shall comply with the requirements of Sections 1010.5 through 1010.5.4.

Doors, gates and turnstiles provided for egress purposes in numbers greater than required by this code shall comply with the requirements of this section. See Section 3201 of the International Building Code for doors swinging over public property.

Doors in the *means of egress* shall be readily distinguishable from the adjacent construction and finishes such that the doors are easily recognizable as doors. Mirrors or similar reflecting materials shall not be used on *means of egress* doors. *Means of egress* doors shall not be concealed by curtains, drapes, decorations or similar materials.

**[BE] 1010.1.1 Size of doors.** The required capacity of each door opening shall be sufficient for the *occupant load* thereof and shall provide a minimum clear opening width of 32 inches (813 mm). The clear opening width of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). Where this section requires a minimum clear opening width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width of 32 inches (813 mm). In Group I-2, doors serving as *means of egress* doors where used for the movement of beds shall provide a minimum clear opening width of 41-1/2 inches (1054 mm). The minimum clear opening height of doors shall be not less than 80 inches (2032 mm).

### Exceptions:

1. In Group R-2 and R-3 *dwelling* and *sleeping units* that are not required to be an Accessible unit, Type A unit or Type B unit, the minimum width shall not apply to door openings that are not part of the required *means of egress*.
2. Group I-3 door openings to resident *sleeping units* that are not required to be an Accessible unit shall have a minimum clear opening width of 28 inches (711 mm).
3. Door openings to storage closets less than 10 square feet (0.93 m<sup>2</sup>) in area shall not be limited by the minimum clear opening width.
4. The maximum width of door leaves in revolving doors that comply with Section 1010.3.1 shall not be limited.
5. The maximum width of door leaves in power-operated doors that comply with Section 1010.3.2 shall not be limited.
6. Door openings within a *dwelling unit* or *sleeping unit* shall have a minimum clear opening height of 78 inches (1981 mm).
7. In *dwelling* and *sleeping units* that are not required to be Accessible, Type A or Type B units, exterior door openings, other than the required *exit* door, shall have a minimum clear opening height of 76 inches (1930 mm).
8. In Groups I-1, R-2, R-3 and R-4, in *dwelling* and *sleeping units* that are not required to be Accessible, Type A or Type B units, the minimum clear opening widths shall not apply to interior egress doors.
9. Door openings required to be *accessible* within Type B units intended for user passage shall have a minimum clear opening width of 31.75 inches (806 mm).
10. Doors to walk-in freezers and coolers less than 1,000 square feet (93 m<sup>2</sup>) in area shall have a maximum width of 60 inches (1524 mm) nominal.
11. Doors serving nonaccessible single-user shower or sauna compartments; toilet stalls; or dressing, fitting or changing rooms shall have a minimum clear opening width of 20 inches (508 mm).

**[BE] 1010.1.1.1 Projections into clear opening.** There shall not be projections into the required clear opening width lower than 34 inches (864 mm) above the floor or ground. Projections into the clear opening width between 34 inches (864 mm) and 80 inches (2032 mm) above the floor or ground shall not exceed 4 inches (102 mm).

**Exception:** Door closers, overhead door stops, power door operators, and electromagnetic door locks shall be permitted to be 78 inches (1980 mm) minimum above the floor.

**[BE] 1010.1.2 Egress door types.** Egress doors shall be of the side-hinged swinging door, pivoted door or balanced door types.

**Exceptions:**

1. Private garages, office areas, factory and storage areas with an *occupant load* of 10 or less.
2. Group I-3 occupancies used as a place of detention.
3. Critical or intensive care patient rooms within suites of health care facilities.
4. Doors within or serving a single *dwelling unit* in Groups R-2 and R-3.
5. In other than Group H occupancies, revolving doors complying with Section 1010.3.1.
6. In other than Group H occupancies, special-purpose horizontal sliding, accordion or folding door assemblies complying with Section 1010.3.3.
7. Power-operated doors in accordance with Section 1010.3.2.
8. Doors serving a bathroom within an individual *sleeping unit* in Group R-1.
9. In other than Group H occupancies, manually operated horizontal sliding doors are permitted in a *means of egress* from spaces with an *occupant load* of 10 or less.

**[BE] 1010.1.2.1 Direction of swing.** Side-hinged swinging doors, pivoted doors and balanced doors shall swing in the direction of egress travel where serving a room or area containing an *occupant load* of 50 or more persons or a Group H occupancy.

**[BE] 1010.1.3 Forces to unlatch and open doors.** The forces to unlatch doors shall comply with the following:

1. Where door hardware operates by push or pull, the operational force to unlatch the door shall not exceed 15 pounds (66.7 N).
2. Where door hardware operates by rotation, the operational force to unlatch the door shall not exceed 28 inch-pounds (315 N-cm).

The force to open doors shall comply with the following:

1. For interior swinging egress doors that are manually operated, other than doors required to be fire rated, the force for pushing or pulling open the door shall not exceed 5 pounds (22 N).
2. For other swinging doors, sliding doors or folding doors, and doors required to be fire rated, the door shall require not more than a 30-pound (133 N) force to be set in motion and shall move to a full-open position when subjected to not more than a 15-pound (67 N) force.

**[BE] 1010.1.3.1 Location of applied forces.** Forces shall be applied to the latch side of the door.

**[BE] 1010.1.3.2 Manual horizontal sliding doors.** Where a manual horizontal sliding door is required to latch, the latch or other mechanism shall prevent the door from rebounding into a partially open position when the door is closed.

**[S][BE] 1010.1.4 Floor elevation.** There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope).

**Exceptions:**

1. At doors serving individual *dwelling units* or *sleeping units* in Groups R-2 and R-3, a door is permitted to open at the top step of ~~((an interior))~~ a flight of stairs, provided that the door does not swing over the top step.
2. At exterior doors serving Groups F, H, R-2 and S and where such doors are not part of an accessible route, the landing at an exterior door shall be not more than 7 inches (178 mm) below the landing on the egress side of the door, provided that the door, other than an exterior storm or screen door, does not swing over the landing.
3. At exterior doors serving Group U and individual *dwelling units* and *sleeping units* in Groups R-2 and R-3, and where such units are not required to be Accessible units, Type A units or Type B units, the landing at an exterior doorway shall be not more than 7-3/4 inches (197 mm) below the landing on the egress side of the door. Such doors, including storm or screen doors, shall be permitted to swing over either landing.
4. Variations in elevation due to differences in finish materials, but not more than 1/2 inch (12.7 mm).
5. Exterior decks, patios or balconies that are part of Type B *dwelling units* or *sleeping units*, that have impervious surfaces and that are not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the *dwelling unit* or *sleeping unit*.

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6. Doors serving equipment spaces not required to be accessible in accordance with Section 1103.2.9 of the *International Building Code* and serving an *occupant load* of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

**[S][BE] 1010.1.5 Landings at doors.** Landings shall have a width not less than the width of the *stairway* or the door, whichever is greater. Doors in the fully open position shall not reduce a required dimension by more than 7 inches (178 mm). Where a landing serves an *occupant load* of 50 or more, doors in any position shall not reduce the landing to less than one-half its required width. When doors open over landings, doors in any position shall not reduce the landing length to less than 12 inches (305 mm). Landings shall have a length measured in the direction of travel of not less than 44 inches (1118 mm).

**Exception:** Landing length in the direction of travel in Groups R-3 and U and within individual units of Group R-2 need not exceed 36 inches (914 mm).

**[BE] 1010.1.6 Thresholds.** Thresholds at doorways shall not exceed 3/4 inch (19.1 mm) in height above the finished floor or landing for sliding doors serving *dwelling units* or 1/2 inch (12.7 mm) above the finished floor or landing for other doors. Raised thresholds and floor level changes greater than 1/4 inch (6.4 mm) at doorways shall be beveled with a slope not greater than 1 unit vertical in 2 units horizontal (50-percent slope).

### Exceptions:

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to 7-3/4 inches (197 mm) in height if all of the following apply:
  - 1.1. The door is not part of the required *means of egress*.
  - 1.2. The door is not part of an *accessible route* as required by Chapter 11 of the *International Building Code*.
  - 1.3. The door is not part of an accessible unit, Type A unit or Type B unit.
2. In Type B units, where Exception 5 to Section 1010.1.4 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed 4-3/4 inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or 4-1/2 inches (114 mm) above the exterior deck, patio or balcony for other doors.

**[BE] 1010.1.7 Door arrangement.** Space between two doors in a series shall be 48 inches (1219 mm) minimum plus the width of a door swinging into the space. Doors in a series shall swing either in the same direction or away from the space between the doors.

### Exceptions:

1. The minimum distance between horizontal sliding power-operated doors in a series shall be 48 inches (1219 mm).
2. Storm and screen doors serving individual *dwelling units* in Groups R-2 and R-3 need not be spaced 48 inches (1219 mm) from the other door.
3. Doors within individual *dwelling units* in Groups R-2 and R-3 other than within Type A *dwelling units*.

**[BE] 1010.2 Door operations.** Except as specifically permitted by this section, egress doors shall be readily openable from the egress side without the use of a key or special knowledge or effort.

**[BE] 1010.2.1 Unlatching.** The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices.

### Exceptions:

1. Places of detention or restraint.
2. Where manually operated bolt locks are permitted by Section 1010.2.5.
3. Doors with automatic flush bolts as permitted by Section 1010.2.4, Item 4.
4. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.

**[BE] 1010.2.2 Hardware.** Door handles, pulls, latches, locks and other operating devices on doors required to be accessible by Chapter 11 of the *International Building Code* shall not require tight grasping, tight pinching or twisting of the wrist to operate.

**[BE] 1010.2.3 Hardware height.** Door handles, pulls, latches, locks and other operating devices shall be installed 34 inches (864 mm) minimum and 48 inches (1219 mm) maximum above the finished floor. Locks used only for security purposes and not used for normal operation are permitted at any height.

**Exception:** Access doors or gates in barrier walls and fences protecting pools, spas and hot tubs shall be permitted to have operable parts of the latch release on self-latching devices at 54 inches (1370 mm) maximum above the finished



floor or ground, provided that the self-latching devices are not also self-locking devices operated by means of a key, electronic opener or integral combination lock.

**[W][S][BE] 1010.2.4 Locks and latches.** Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint *as approved by the building official.*
2. ~~((In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.))~~ Approved, listed locks without delayed egress shall be permitted in Group I-1 condition 2 assisted living facilities licensed by the state of Washington, provided that:
  - 2.1. The clinical needs of one or more patients require specialized security measures for their safety.
  - 2.2. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
  - 2.3. The doors unlock upon loss of electrical power controlling the lock or lock mechanism.
  - 2.4. The lock shall be capable of being deactivated by a signal from a switch located in an approved location.
  - 2.5. There is a system, such as a keypad and code, in place that allows visitors, staff persons and appropriate residents to exit. Instructions for exiting shall be posted within 6 feet (1829 mm) of the door.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in places of religious worship, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
  - 3.1. The locking device is readily distinguishable as locked.
  - 3.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: "THIS DOOR TO REMAIN UNLOCKED (~~WHEN THIS SPACE IS OCCUPIED~~) DURING BUSINESS HOURS." The sign shall be in letters 1 inch (25 mm) high on a contrasting background; ~~(-)~~ and
  - 3.3. The use of the key-operated locking device is revocable by the ~~(fire code)~~ *building official* for due cause.
4. Where egress doors are used in pairs, *approved* automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts does not have a doorknob or surface-mounted hardware on the egress side of the door.
5. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
6. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed* fire door test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.
8. Other than *egress courts*, where occupants must egress from an exterior space through the building for *means of egress, exit access* doors shall be permitted to be equipped with an *approved* locking device where installed and operated in accordance with all of the following:
  - 8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.
  - 8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required *exit access* door on the exterior side.
  - 8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
  - 8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m<sup>2</sup>) in area, shall be provided at each *exit access* door to determine if there are occupants using the outdoor area.
  - 8.5. A readily visible durable sign shall be posted on the interior side on or adjacent to each locked required *exit access* door serving the exterior area stating: "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
  - 8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.

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9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling* or *sleeping units*.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m<sup>2</sup>) or less, serving a private office space.
11. Doors from elevator lobbies providing access to exits are permitted to be locked during or after business hours where subsections 11.1 through 11.5 of this section are satisfied.
  - 11.1. The lobby doors shall unlock automatically upon fire alarm;
  - 11.2. The lobby doors shall unlock automatically upon power loss;
  - 11.3. The alarm system shall include smoke detection in the elevator lobby and at least two detectors on the tenant side within 15 feet (4572 mm) of the door;
  - 11.4. Access through the tenant portion of the building to both exits shall be unobstructed; and
  - 11.5. The building shall have an automatic sprinkler system throughout in accordance with Section 903.3.1.1 or 903.3.1.2.

[S][BE] **1010.2.5 Bolt locks.** Manually operated flush bolts or surface bolts are not permitted.

### Exceptions:

1. On doors not required for egress in individual *dwelling units* or *sleeping units*.
2. Where a pair of doors serves a storage or equipment room, manually operated edge- or surface-mounted bolts or self-latching flush bolts are permitted on the inactive leaf.
3. Where a pair of doors serves an *occupant load* of less than 50 persons in a Group B, F or S occupancy, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf. The inactive leaf shall not contain doorknobs, panic bars or similar operating hardware.
4. Where a pair of doors serves a Group B, F or S occupancy, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf provided that such inactive leaf is not needed to meet egress capacity requirements and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. The inactive leaf shall not contain doorknobs, panic bars or similar operating hardware.
5. Where a pair of doors serves patient care rooms in Group I-2 occupancies, self-latching edge- or surface-mounted bolts are permitted on the inactive leaf provided that the inactive leaf is not needed to meet egress capacity requirements and the inactive leaf shall not contain doorknobs, panic bars or similar operating hardware.

[BE] **1010.2.6 Closet doors.** Closet doors that latch in the closed position shall be openable from inside the closet.

[S][BE] **1010.2.7 Stairway doors.** Interior *stairway means of egress* doors shall be openable from both sides without the use of a key or special knowledge or effort.

### Exceptions:

1. *Stairway* discharge doors shall be openable from the egress side and shall only be locked from the opposite side.
2. This section shall not apply to doors arranged in accordance with Section 403.5.3 of the *International Building Code*.
3. *Stairway* exit doors are permitted to be locked from the side opposite the egress side, provided that they are openable from the egress side and capable of being unlocked simultaneously without unlatching upon a signal from the *fire command center*, if present, or a signal by emergency personnel from a single location inside the main entrance to the building.
4. *Stairway exit* doors shall be openable from the egress side and shall only be locked from the opposite side in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single *exit stairway* where permitted in Section 1006.3.4.
5. *Stairway* exit doors shall be openable from the egress side and shall only be locked from the opposite side in Group R-2 occupancies where the only interior access to the *dwelling unit* is from a single exit stairway where permitted in Section 1006.3.4.
6. In stairways serving more than four stories in non-high-rise buildings, doors are permitted to be locked from the side opposite the egress side, provided they are openable from the egress side and capable of being unlocked simultaneously without unlatching upon a signal from the fire command center, if present, or a signal by emergency personnel from a single location inside the main entrance to the building. A communication system that complies with Section 403.5.3.1 of the Seattle Building Code shall be provided.

**[BE] 1010.2.8 Locking arrangements in educational occupancies.** In Group E occupancies, Group B educational occupancies and Group I-4 occupancies, egress doors from classrooms, offices and other occupied rooms with locking arrangements designed to keep intruders from entering the room shall comply with all of the following conditions:

1. The door shall be capable of being unlocked from outside the room with a key or other *approved* means.
2. The door shall be openable from within the room in accordance with Section 1010.2.
3. Modifications shall not be made to *listed* panic hardware, fire door hardware or door closers.
4. Modifications to fire door assemblies shall be in accordance with NFPA 80.

Remote locking or unlocking of doors from an *approved* location shall be permitted in addition to the unlocking operation in Item 1.

**[BE] 1010.2.9 Panic and fire exit hardware.** Swinging doors serving a Group H occupancy and swinging doors serving rooms or spaces with an *occupant load* of 50 or more in a Group A or E occupancy shall not be provided with a latch or lock other than *panic hardware* or *fire exit hardware*.

**Exceptions:**

1. A main *exit* of a Group A occupancy shall be permitted to have locking devices in accordance with Section 1010.2.4, Item 3.
2. Doors provided with *panic hardware* or *fire exit hardware* and serving a Group A or E occupancy shall be permitted to be electrically locked in accordance with Section 1010.2.12 or 1010.2.11.
3. *Exit access* doors serving occupied exterior areas shall be permitted to be locked in accordance with Section 1010.2.4, Item 8.
4. Courtrooms shall be permitted to be locked in accordance with Section 1010.2.13, Item 3.

**[BE] 1010.2.9.1 Refrigeration machinery room.** Refrigeration machinery rooms larger than 1,000 square feet (93 m<sup>2</sup>) shall have not less than two *exit* or *exit access doorways* that swing in the direction of egress travel and shall be equipped with *panic hardware* or *fire exit hardware*.

**[BE] 1010.2.9.2 Rooms with electrical equipment.** *Exit* or *exit access* doors serving transformer vaults, rooms designated for batteries or energy storage systems, or modular data centers shall be equipped with *panic hardware* or *fire exit hardware*. Rooms containing electrical equipment rated 800 amperes or more that contain overcurrent devices, switching devices or control devices and where the *exit* or *exit access* door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70, such doors shall not be provided with a latch or lock other than *panic hardware* or *fire exit hardware*. The doors shall swing in the direction of egress travel.

**[BE] 1010.2.9.3 Installation.** Where *panic* or *fire exit hardware* is installed, it shall comply with the following:

1. *Panic hardware* shall be *listed* in accordance with UL 305.
2. *Fire exit hardware* shall be *listed* in accordance with UL 10C and UL 305.
3. The actuating portion of the releasing device shall extend not less than one-half of the door leaf width.
4. The maximum unlatching force shall not exceed 15 pounds (67 N).

**[BE] 1010.2.9.4 Balanced doors.** If *balanced doors* are used and *panic hardware* is required, the *panic hardware* shall be the push-pad type and the pad shall not extend more than one-half the width of the door measured from the latch side.

**[BE] 1010.2.10 Monitored or recorded egress.** Where electrical systems that monitor or record egress activity are incorporated, the locking system shall comply with Section 1010.2.11, 1010.2.12, 1010.2.13, 1010.2.14 or 1010.2.15, or shall be readily openable from the egress side without the use of a key or special knowledge or effort.

**[S][BE] 1010.2.11 Door hardware release of electrically locked egress doors.** Door hardware release of electric locking systems shall be permitted on doors in the *means of egress* in any occupancy except Group H where installed and operated in accordance with all of the following:

1. The door hardware (~~that~~) is affixed to the door leaf and has an obvious method of operation that is readily operated under all lighting conditions.
2. The door hardware is capable of being operated with one hand without special knowledge, keys or tools, and shall comply with Section 1010.2.1.
3. Operation of the door hardware directly interrupts the power to the electric lock and unlocks the door immediately.
4. Loss of power to the electric locking system automatically unlocks the door.
5. Where *panic* or *fire exit hardware* is required by Section 1010.2.9, operation of the *panic* or *fire exit hardware* also releases the electric lock.
6. The locking system units shall be *listed* in accordance with UL 294.

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**[BE] 1010.2.12 Sensor release of electrically locked egress doors.** Sensor release of electric locking systems shall be permitted on doors located in the *means of egress* in any occupancy except Group H where installed and operated in accordance with all of the following criteria:

1. The sensor shall be installed on the egress side, arranged to detect an occupant approaching the doors and shall cause the electric locking system to unlock.
2. The electric locks shall be arranged to unlock by a signal from or loss of power to the sensor.
3. Loss of power to the lock or locking system shall automatically unlock the electric locks.
4. The doors shall be arranged to unlock from a manual unlocking device located 40 inches to 48 inches (1016 mm to 1219 mm) vertically above the floor and within 5 feet (1524 mm) of the secured doors. Ready access shall be provided to the manual unlocking device and the device shall be clearly identified by a sign that reads "PUSH TO EXIT." When operated, the manual unlocking device shall result in direct interruption of power to the electric lock—*independent of other electronics*—and the electric lock shall remain unlocked for not less than 30 seconds.
5. Activation of the building fire alarm system, where provided, shall automatically unlock the electric lock, and the electric lock shall remain unlocked until the fire alarm system has been reset.
6. Activation of the building *automatic sprinkler system* or fire detection system, where provided, shall automatically unlock the electric lock. The electric lock shall remain unlocked until the fire alarm system has been reset.
7. Emergency lighting shall be provided on the egress side of the door.
8. The door locking system units shall be *listed* in accordance with UL 294.

**[S][BE] 1010.2.13 Delayed egress.** Delayed egress locking systems shall be permitted to be installed on doors serving the following occupancies in buildings that are equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or an *approved* automatic smoke or heat detection system installed in accordance with Section 907.2.((+)) Delayed egress locks are permitted in libraries in both Group A and E occupancies in locations other than at main exit doors, and in Group E day care occupancies.

1. Group B, F, I, M, R, S and U occupancies.
2. Group E classrooms with an *occupant load* of less than 50.
3. In courtrooms in Group A-3 and B occupancies, delayed egress locking systems shall be permitted to be installed on *exit* or *exit access* doors, other than the main *exit* or *exit access* door, in buildings that are equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

**[BE] 1010.2.13.1 Delayed egress locking system.** The delayed egress locking system shall be installed and operated in accordance with all of the following:

1. The delay electronics of the delayed egress locking system shall deactivate upon actuation of the *automatic sprinkler system* or automatic fire detection system, allowing immediate, free egress.
2. The delay electronics of the delayed egress locking system shall deactivate upon loss of power controlling the lock or lock mechanism, allowing immediate free egress.
3. The delayed egress locking system shall have the capability of being deactivated at the *fire command center* and other *approved* locations.
4. An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the delay electronics have been deactivated, rearming the delay electronics shall be by manual means only.

**Exception:** Where *approved*, a delay of not more than 30 seconds is permitted on a delayed egress door.

5. The egress path from any point shall not pass through more than one delayed egress locking system.

### Exceptions:

1. In Group I-1, Condition 2, Group I-2 or I-3 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds.
2. In Group I-1, Condition 1 or Group I-4 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware:

**Exception:** Where *approved*, in Group I occupancies, the installation of a sign is not required where care recipients who, because of clinical needs, require restraint or containment as part of the function of the treatment area.

- 6.1. For doors that swing in the direction of egress, the sign shall read: "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."
- 6.2. For doors that swing in the opposite direction of egress, the sign shall read: "PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."
- 6.3. The sign shall comply with the visual character requirements in ICC A117.1.
7. Emergency lighting shall be provided on the egress side of the door.
8. The delayed egress locking system units shall be *listed* in accordance with UL 294.

**[W][S][BE] 1010.2.14 Controlled egress doors in Groups I-1 and I-2.** Electric locking systems, including electro-mechanical locking systems and electromagnetic locking systems, shall be permitted to be locked in the means of egress in Group I-1 or I-2 occupancies where the clinical needs of persons receiving care require their containment. Controlled egress doors shall be permitted in such occupancies where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or an *approved* automatic smoke detection system installed in accordance with Section 907, provided that the doors are installed and operate in accordance with all of the following:

1. The door locks shall unlock on actuation of the *automatic sprinkler system* or automatic smoke detection system.
2. The door locks shall unlock on loss of power controlling the lock or lock mechanism.
3. The door locking system shall be installed to have the capability of being unlocked by a switch located at the *fire command center*, a nursing station or other *approved* location. The switch shall directly break power to the lock.
4. A building occupant shall not be required to pass through more than one door equipped with a (~~controlled~~) special egress locking system before entering an *exit*.
5. The procedures for unlocking the doors shall be described and *approved* as part of the emergency planning and preparedness required by Chapter 4.
- ~~6. All clinical staff shall have the keys, codes or other means necessary to operate the locking systems.~~
6. There is a system, such as a keypad and code, in place that allows visitors, staff persons and appropriate residents to exit. Instructions for exiting shall be posted within 6 feet (1829 mm) of the door.
7. Emergency lighting shall be provided at the door.
8. The door locking system units shall be *listed* in accordance with UL 294.

**Exceptions:**

1. Items 1 through 4 and 6 shall not apply to doors to areas (~~occupied by~~) where persons who, because of clinical needs, require restraint or containment as part of the function of a psychiatric or cognitive treatment area provided that all staff shall have the keys, codes or other means necessary to operate the locking devices.
2. Items 1 through 4 and 6 shall not apply to doors to areas where a *listed* egress control system is utilized to reduce the risk of child abduction from nursery and obstetric areas of a Group I-2 hospital.

**[BE] 1010.2.15 Locking arrangements in buildings within correctional facilities.** In buildings within correctional and detention facilities, doors in *means of egress* serving rooms or spaces occupied by persons whose movements are controlled for security reasons shall be permitted to be locked where equipped with egress control devices that shall unlock manually and by not less than one of the following means:

1. Activation of an *automatic sprinkler system* installed in accordance with Section 903.3.1.1.
2. Activation of an *approved* manual fire alarm box.
3. A signal from a constantly attended location.

**[BE] 1010.3 Special doors.** Special doors and security grilles shall comply with the requirements of Sections 1010.3.1 through 1010.3.4.

**[BE] 1010.3.1 Revolving doors.** Revolving doors shall comply with the following:

1. Revolving doors shall comply with BHMA A156.27 and shall be installed in accordance with the manufacturer's instructions.
2. Each revolving door shall be capable of *breakout* in accordance with BHMA A156.27 and shall provide an aggregate width of not less than 36 inches (914 mm).
3. A revolving door shall not be located within 10 feet (3048 mm) of the foot or top of *stairways* or escalators. A dispersal area shall be provided between the *stairways* or escalators and the revolving doors.

4. There is an actuation of a manual control switch, in an *approved* location and clearly identified, that reduces the *breakout* force to not more than 130 pounds (578 N).

**[BE] 1010.3.2 Power-operated doors.** Where *means of egress* doors are operated or assisted by power, the design shall be such that in the event of power failure, the door is capable of being opened manually to permit *means of egress* travel or closed where necessary to safeguard *means of egress*. The forces required to open these doors manually shall not exceed those specified in Section 1010.1.3, except that the force to set the door in motion shall not exceed 50 pounds (220 N). The door shall be capable of opening from any position to the full width of the opening in which such door is installed when a force is applied to the door on the side from which egress is made. Power-operated swinging doors, power-operated sliding doors and power-operated folding doors shall comply with BHMA A156.10. Power-assisted swinging doors and low energy power-operated swinging doors shall comply with BHMA A156.19. Low-energy power-operated sliding doors and low-energy power-operated folding doors shall comply with BHMA A156.38.

**Exceptions:**

1. Occupancies in Group I-3.
2. Special-purpose horizontal sliding, accordion or folding doors complying with Section 1010.3.3.
3. For a biparting door in the emergency *breakout* mode, a door leaf located within a multiple-leaf opening shall be exempt from the minimum 32-inch (813 mm) single-leaf requirement of Section 1010.1.1, provided that a minimum 32-inch (813 mm) clear opening is provided when the two biparting leaves meeting in the center are broken out.

**[BE] 1010.3.3 Special-purpose horizontal sliding, accordion or folding doors.** In other than Group H occupancies, special-purpose horizontal sliding, accordion, or folding door assemblies permitted to be a component of a *means of egress* in accordance with Exception 6 to Section 1010.1.2 shall comply with all of the following criteria:

1. The doors shall be power operated and shall be capable of being operated manually in the event of power failure.
2. The doors shall be openable by a simple method without special knowledge or effort from the egress side or sides.
3. The force required to operate the door shall not exceed 30 pounds (133 N) to set the door in motion and 15 pounds (67 N) to close the door or open it to the minimum required width.
4. The door shall be openable with a force not to exceed 15 pounds (67 N) when a force of 250 pounds (1100 N) is applied perpendicular to the door adjacent to the operating device.
5. The door assembly shall comply with the applicable *fire protection rating* and, where rated, shall be self-closing or automatic closing by smoke detection in accordance with Section 716.2.6.6 of the *International Building Code*, shall be installed in accordance with NFPA 80 and shall comply with Section 716 of the *International Building Code*.
6. The door assembly shall have an integrated standby power supply.
7. The door assembly power supply shall be electrically supervised.
8. The door shall open to the minimum required width within 10 seconds after activation of the operating device.

**[BE] 1010.3.4 Security grilles.** In Groups B, F, M and S, horizontal sliding or vertical security grilles are permitted at the main *exit* and shall be openable from the inside without the use of a key or special knowledge or effort during periods that the space is occupied. The grilles shall remain secured in the full-open position during the period of occupancy by the general public. Where two or more *exits* or *access to exits* are required, not more than one-half of the *exits* or *exit access doorways* shall be equipped with horizontal sliding or vertical security grilles.

**[W] 1010.3.4.1 Fixed transit and passenger rail systems.** In fixed transit and passenger rail system stations, horizontal and vertical security grilles are permitted at station entrances as a component in the means of egress when the station is under constant supervision by on-site security personnel and an exit door with panic hardware that swings in the direction of egress, with a minimum clear width of 32 inches, provided within 10 feet (3048 mm) of the gate. The security grilles shall remain secured in the full-open position during the period of occupancy by the general public.

**[BE] 1010.4 Gates.** Gates serving the *means of egress* system shall comply with the requirements of this section. Gates used as a component in a *means of egress* shall conform to the applicable requirements for doors.

**Exception:** Horizontal sliding or swinging gates exceeding the 4-foot (1219 mm) maximum leaf width limitation are permitted in fences and walls surrounding a stadium.

**[BE] 1010.4.1 Stadiums.** *Panic hardware* is not required on gates surrounding stadiums where such gates are under constant immediate supervision while the public is present, and where safe dispersal areas based on 3 square feet (0.28 m<sup>2</sup>) per occupant are located between the fence and enclosed space. Such required safe dispersal areas shall not be located less than 50 feet (15 240 mm) from the enclosed space. See Section 1028.5 for *means of egress* from safe dispersal areas.

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**[BE] 1010.5 Turnstiles and similar devices.** Turnstiles or similar devices that restrict travel to one direction shall not be placed so as to obstruct any required *means of egress*, except where permitted in accordance with Sections 1010.5.1, 1010.5.2 and 1010.5.3.

**[BE] 1010.5.1 Capacity.** Each turnstile or similar device shall be credited with a capacity based on not more than a 50-person *occupant load* where all of the following provisions are met:

1. Each device shall turn free in the direction of egress travel when primary power is lost and on the manual release by an employee in the area.
2. Such devices are not given credit for more than 50 percent of the required egress capacity or width.
3. Each device is not more than 39 inches (991 mm) high.
4. Each device has not less than 16-1/2 inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).

**[BE] 1010.5.1.1 Clear width.** Where located as part of an *accessible route*, turnstiles shall have not less than 36 inches (914 mm) clear width at and below a height of 34 inches (864 mm), not less than 32 inches (813 mm) clear width between 34 inches (864 mm) and 80 inches (2032 mm) and shall consist of a mechanism other than a revolving device.

**[BE] 1010.5.2 Security access turnstiles.** Security access turnstiles that inhibit travel in the direction of egress utilizing a physical barrier shall be permitted to be considered as a component of the *means of egress*, provided that all of the following criteria are met:

1. The building is protected throughout by an *approved*, supervised *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Each security access turnstile lane configuration has a minimum clear passage width of 22 inches (559 mm).
3. Any security access turnstile lane configuration providing a clear passage width of less than 32 inches (810 mm) shall be credited with a maximum egress capacity of 50 persons.
4. Any security access turnstile lane configuration providing a clear passage width of 32 inches (810 mm) or more shall be credited with a maximum egress capacity as calculated in accordance with Section 1005.
5. Each secured physical barrier shall automatically retract or swing to an unobstructed open position in the direction of egress, under each of the following conditions:
  - 5.1. Upon loss of power to the turnstile or any part of the access control system that secures the physical barrier.
  - 5.2. Upon actuation of a clearly identified manual release device with ready access that results in direct interruption of power to each secured physical barrier, after which such barriers remain in the open position for not less than 30 seconds. The manual release device shall be positioned at one of the following locations:
    - 5.2.1. On the egress side of each security access turnstile lane.
    - 5.2.2. At an *approved* location where it can be actuated by an employee assigned to the area at all times that the building is occupied.
  - 5.3. Upon actuation of the building fire alarm system, if provided, after which the physical barrier remains in the open position until the fire alarm system is manually reset.

**Exception:** Actuation of a manual fire alarm box.
- 5.4. Upon actuation of the building *automatic sprinkler system* or fire detection system, after which the physical barrier remains in the open position until the fire alarm system is manually reset.

**[BE] 1010.5.3 High turnstile.** Turnstiles more than 39 inches (991 mm) high shall meet the requirements for revolving doors or the requirements of Section 1010.5.2 for security access turnstiles.

**[BE] 1010.5.4 Additional door.** Where serving an *occupant load* greater than 300, each turnstile that is not portable shall have a side-hinged swinging door that conforms to Section 1010.1 within 50 feet (15 240 mm).

**Exception:** A side-hinged swinging door is not required at security access turnstiles that comply with Section 1010.5.2.

## SECTION 1011 STAIRWAYS

**[W][BE] 1011.1 General.** *Stairways* serving occupied portions of a building shall comply with the requirements of Sections 1011.2 through 1011.13. *Alternating tread devices* shall comply with Section 1011.14. Ship's ladders shall comply with Section 1011.15. Ladders shall comply with Section 1011.16.

### Exceptions:

1. Within rooms or spaces used for assembly purposes, stepped *aisles* shall comply with Section 1030.

2. Stairways, alternating tread devices, ship's ladders, or ladders within an individual dwelling unit or sleeping unit used for egress from areas of 200 square feet (18.6 m<sup>2</sup>) or less, and not containing the primary bathroom or kitchen, are exempt from the requirements of Section 1011. Such areas shall not be located more than 10 feet (3048 mm) above the finished floor of the space below. \*\*

[S][BE] **1011.2 Width and capacity.** The required capacity of *stairways* shall be determined as specified in Section 1005.1, but the minimum width shall be not less than 44 inches (1118 mm). See Section 1009.3 for *accessible means of egress stairways*.

**Exceptions:**

1. *Stairways* serving an *occupant load* of less than 50 shall have a width of not less than 36 inches (914 mm).
2. *Spiral stairways* as provided for in Section 1011.10.
3. Where an incline platform lift or *stairway* chairlift is installed on *stairways* serving occupancies in Group R-3, or within *dwelling units* in occupancies in Group R-2, a clear passage width not less than 20 inches (508 mm) shall be provided. Where the seat and platform can be folded when not in use, the distance shall be measured from the folded position.
4. Stairways that are designed exclusively for circulation.

[BE] **1011.3 Headroom.** *Stairways* shall have a headroom clearance of not less than 80 inches (2032 mm) measured vertically from a line connecting the edge of the *nosings*. Such headroom shall be continuous above the *stairway* to the point where the line intersects the landing below, one tread depth beyond the bottom riser. The minimum clearance shall be maintained the full width of the *stairway* and landing.

**Exceptions:**

1. *Spiral stairways* complying with Section 1011.10 are permitted a 78-inch (1981 mm) headroom clearance.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; where the *nosings* of treads at the side of a *flight* extend under the edge of a floor opening through which the *stair* passes, the floor opening shall be allowed to project horizontally into the required headroom not more than 4-3/4 inches (121 mm).

[BE] **1011.4 Walkline.** The walkline across *winder* treads shall be concentric to the direction of travel through the turn and located 12 inches (305 mm) from the side where the *winders* are narrower. The 12-inch (305 mm) dimension shall be measured from the widest point of the clear *stair* width at the walking surface of the *winder*. Where *winders* are adjacent within the *flight*, the point of the widest clear *stair* width of the adjacent *winders* shall be used.

[BE] **1011.5 Stair treads and risers.** *Stair* treads and risers shall comply with Sections 1011.5.1 through 1011.5.5.3.

[BE] **1011.5.1 Dimension reference surfaces.** For the purpose of this section, all dimensions are exclusive of carpets, rugs or runners.

[S][BE] **1011.5.2 Riser height and tread depth.** *Stair* riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the *nosings* of adjacent treads or between the *stairway* landing and the adjacent tread. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosings*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the *stair*.

**Exceptions:**

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be 7-3/4 inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). A *nosings* projection not less than 3/4 inch (19.1 mm) but not more than 1-1/4 inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
4. See ((Section 503.1 of)) the *International Existing Building Code* for the replacement of existing *stairways*.



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5. In Group I-3 facilities, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m<sup>2</sup>) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).

**[BE] 1011.5.3 Winder treads.** *Winder* treads are not permitted in *means of egress stairways* except within a *dwelling unit*.

### Exceptions:

1. Curved *stairways* in accordance with Section 1011.9.
2. *Spiral stairways* in accordance with Section 1011.10.

**[BE] 1011.5.4 Dimensional uniformity.** *Stair* treads and risers shall be of uniform size and shape. The tolerance between the largest and smallest riser height or between the largest and smallest tread depth shall not exceed 3/8 inch (9.5 mm) in any *flight of stairs*. The greatest *winder* tread depth at the walkline within any *flight of stairs* shall not exceed the smallest by more than 3/8 inch (9.5 mm).

### Exceptions:

1. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to comply with the dimensional nonuniformity in Section 1030.14.2.
2. Consistently shaped *winders*, complying with Section 1011.5, differing from rectangular treads in the same *flight of stairs*.
3. Nonuniform riser dimension complying with Section 1011.5.4.1.

**[S][BE] 1011.5.4.1 Nonuniform height risers.** Where the bottom or top riser adjoins a sloping *public way*, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope. ~~((to less than 4 inches (102 mm) in height, with the variation in height of the bottom or top riser not to exceed 1 unit vertical in 12 units horizontal (8 percent slope) of *stair* width. The nosings or leading edges of treads at such nonuniform height risers shall have a distinctive marking stripe, different from any other *nosings* marking provided on the *stair flight*. The distinctive marking stripe shall be visible in descent of the *stair* and shall have a slip-resistant surface. Marking stripes shall have a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).))~~

**[BE] 1011.5.5 Nosing and riser profile.** *Nosings* shall have a curvature or bevel of not less than 1/16 inch (1.6 mm) but not more than 9/16 inch (14.3 mm) from the foremost projection of the tread. Risers shall be solid and vertical or sloped under the tread above from the underside of the *nosings* above at an angle not more than 30 degrees (0.52 rad) from the vertical.

**[BE] 1011.5.5.1 Nosing projection size.** The leading edge (*nosings*) of treads shall project not more than 1-1/4 inches (32 mm) beyond the tread below.

**[BE] 1011.5.5.2 Nosing projection uniformity.** *Nosing* projections of the leading edges shall be of uniform size, including the projections of the *nosings*' leading edge of the floor at the top of a *flight*.

**[BE] 1011.5.5.3 Solid risers.** Risers shall be solid.

### Exceptions:

1. Solid risers are not required for *stairways* that are not required to comply with Section 1009.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. The size of the opening in the riser is not restricted.
3. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1011.10.

**[BE] 1011.6 Stairway landings.** There shall be a floor or landing at the top and bottom of each *stairway*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where wheelchair spaces are required on the stairway landing in accordance with Section 1009.6.3, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces.

### Exceptions:

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower flight at the landing *nosings* and the intersection of the walkline of the upper flight at the *nosings* of the lowest tread of the upper flight.

3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the flight served.

**[BE] 1011.7 Stairway construction.** *Stairways* shall be built of materials consistent with the types permitted for the type of construction of the building.

**Exceptions:**

1. Wood *handrails* shall be permitted in all types of construction.
2. Interior *exit stairway* in accordance with Section 510.2 of the *International Building Code*.

**[BE] 1011.7.1 Stairway walking surface.** The walking surface of treads and landings of a *stairway* shall not be sloped steeper than 1 unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

**Exceptions:**

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of 1/2-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of 1-1/8 inches (29 mm) cannot pass through the opening.

**[BE] 1011.7.2 Outdoor conditions.** Outdoor *stairways* and outdoor approaches to *stairways* shall be designed so that water will not accumulate on walking surfaces.

**[BE] 1011.7.3 Enclosures under interior stairways.** The walls and soffits within enclosed usable spaces under enclosed and unenclosed *stairways* shall be protected by 1-hour fire-resistance-rated construction or the *fire-resistance rating* of the *stairway* enclosure, whichever is greater. Access to the enclosed space shall not be directly from within the *stairway* enclosure.

**Exception:** Spaces under *stairways* serving and contained within a single residential *dwelling unit* in Group R-2 or R-3 shall be permitted to be protected on the enclosed side with 1/2-inch (12.7 mm) gypsum board.

**[BE] 1011.7.4 Enclosures under exterior stairways.** There shall not be enclosed usable space under *exterior exit stairways* unless the space is completely enclosed in 1-hour *fire-resistance-rated* construction. The open space under *exterior stairways* shall not be used for any purpose.

**[S][BE] 1011.8 Vertical rise.** A *flight of stairs* shall not have a vertical rise greater than 12 feet (3658 mm) between floor levels or landings.

**Exceptions:**

1. *Spiral stairways* used as a *means of egress* from technical production areas.
2. Stairways that are designed exclusively for circulation.

**[BE] 1011.9 Curved stairways.** Curved *stairways* with *winder* treads shall have treads and risers in accordance with Section 1011.5 and the smallest radius shall be not less than twice the minimum width or required capacity of the *stairway*.

**Exception:** The radius restriction shall not apply to curved *stairways* in Group R-3 and within individual *dwelling units* in Group R-2.

**[S][BE] 1011.10 Spiral stairways.** *Spiral stairways* are permitted to be used as a component in the *means of egress* only within *dwelling units* or from a space not more than 250 square feet (23 m<sup>2</sup>) in area and serving not more than five occupants, ((~~or~~)) from technical production areas in accordance with Section 410.5 of the *International Building Code* or as approved by the building official.

1. A *spiral stairway* shall have a 6-3/4-inch (171 mm) minimum clear tread depth at a point 12 inches (305 mm) from the narrow edge. The risers shall be sufficient to provide a headroom of 78 inches (1981 mm) minimum, but riser height shall not be more than 9-1/2 inches (241 mm). The minimum *stairway* clear width at and below the *handrail* shall be 26 inches (660 mm).
2. Spiral stairways are permitted to be used exclusively for circulation, provided:
  - 2.1. The spiral stairway connects any combination of the following: Group B occupancy, Group R occupancy, or Group A occupancies that are accessory to a Group R occupancy;
  - 2.2. It can be demonstrated that the occupants are unlikely to access the spiral stairway in an emergency;
  - 2.3. The required means of egress is clear and readily visible to occupants; and

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2.4. A placard is installed at the spiral stairway warning occupants that the spiral stairway is “NOT AN EXIT” in accordance with Section 1013.7 of the *International Building Code*.

**[BE] 1011.11 Handrails.** *Flights of stairways shall have handrails on each side and shall comply with Section 1014. Where glass is used to provide the handrail, the handrail shall comply with Section 2407 of the International Building Code.*

### Exceptions:

1. *Flights of stairways within dwelling units, and flights of spiral stairways are permitted to have a handrail on one side only.*
2. *Decks, patios and walkways that have a single change in elevation where the landing depth on each side of the change of elevation is greater than what is required for a landing do not require handrails.*
3. *In Group R-3 occupancies, a change in elevation consisting of a single riser at an entrance or egress door does not require handrails.*
4. *Changes in room elevations of three or fewer risers within dwelling units and sleeping units in Group R-2 and R-3 do not require handrails.*
5. *Where a platform lift is in a stationary position and the floor of the platform lift serves as the upper landing of a stairway, handrails shall not be required on the stairway, provided that all of the following criteria are met:*
  - 5.1. *The stairway contains not more than two risers.*
  - 5.2. *A handhold, positioned horizontally or vertically, is located on one side of the stairway adjacent to the top landing.*
  - 5.3. *The handhold is located not less than 34 inches (864 mm) and not more than 42 inches (1067 mm) above the bottom landing of the stairway.*
  - 5.4. *The handhold gripping surface complies with Section 1014.3 and is not less than 4.5 inches (114 mm) in length.*

**[S][BE] 1011.12 Stairway to roof.** *In buildings four or more stories above grade plane, one stairway shall extend to the roof surface, unless the roof has a slope steeper than 4 units vertical in 12 units horizontal (33-percent slope).*

### Exceptions:

1. *Other than where required by Section 1011.12.1, in buildings without an occupied roof, access to the roof from the top story shall be permitted to be by an alternating tread device ((~~5~~)) or a ship's ladder, ((~~or a permanent ladder.~~))*
2. *Access to the roof is not required in Group R-3 occupancies.*

**[BE] 1011.12.1 Stairway to elevator equipment.** *Roofs and penthouses containing elevator equipment that must be accessed for maintenance are required to be accessed by a stairway.*

**[S][BE] 1011.12.2 Roof access.** *Where a stairway is provided to a roof, access to the roof shall be provided through a penthouse complying with Section 1511.2 of the International Building Code.*

**Exception:** *In buildings without an occupied roof, access to the roof shall be permitted to be a roof hatch or trap door not less than 16 square feet (1.5 m<sup>2</sup>) in area and having a minimum dimension of 2 feet 6 inches (((~~6+0~~))) 762 mm).*

**[BE] 1011.13 Guards.** *Guards shall be provided along stairways and landings where required by Section 1015 and shall be constructed in accordance with Section 1015. Where the roof hatch opening providing the required access is located within 10 feet (3049 mm) of the roof edge, such roof access or roof edge shall be protected by guards installed in accordance with Section 1015.*

**[BE] 1011.14 Alternating tread devices.** *Alternating tread devices are limited to an element of a means of egress in buildings of Groups F, H and S from a mezzanine not more than 250 square feet (23 m<sup>2</sup>) in area and that serves not more than five occupants; in buildings of Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m<sup>2</sup>) in area and for access to unoccupied roofs. Alternating tread devices used as a means of egress shall not have a rise greater than 20 feet (6096 mm) between floor levels or landings.*

**[BE] 1011.14.1 Handrails of alternating tread devices.** *Handrails shall be provided on both sides of alternating tread devices and shall comply with Section 1014.*

**[BE] 1011.14.2 Treads of alternating tread devices.** *Alternating tread devices shall have a minimum tread depth of 5 inches (127 mm), a minimum projected tread depth of 8-1/2 inches (216 mm), a minimum tread width of 7 inches (178 mm) and a maximum riser height of 9-1/2 inches (241 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projections of adjacent treads. The riser height shall be measured vertically between the leading edges of adjacent treads. The riser height and tread depth provided shall result in an angle of ascent from the horizontal of between 50 and 70 degrees (0.87 and 1.22 rad). The initial tread of the device shall begin at the same elevation as the platform, landing or floor surface.*

**Exception:** *Alternating tread devices* used as an element of a *means of egress* in buildings from a *mezzanine* area not more than 250 square feet (23 m<sup>2</sup>) in area that serves not more than five occupants shall have a minimum tread depth of 3 inches (76 mm) with a minimum projected tread depth of 10-1/2 inches (267 mm). The rise to the next alternating tread surface shall not exceed 8 inches (203 mm).

**[BE] 1011.15 Ship's ladders.** Ship's ladders are permitted to be used in Group I-3 as a component of a *means of egress* to and from control rooms or elevated facility observation stations not more than 250 square feet (23 m<sup>2</sup>) with not more than three occupants and for access to unoccupied roofs. The minimum clear width at and below the *handrails* shall be 20 inches (508 mm). Ship's ladders shall be designed for the live loads indicated in Section 1607.17 of the *International Building Code*.

**[BE] 1011.15.1 Handrails of ship's ladders.** *Handrails* shall be provided on both sides of ship's ladders.

**[BE] 1011.15.2 Treads of ship's ladders.** Ship's ladders shall have a minimum tread depth of 5 inches (127 mm). The tread shall be projected such that the total of the tread depth plus the *nosing* projection is not less than 8-1/2 inches (216 mm). The maximum riser height shall be 9-1/2 inches (241 mm).

**[BE] 1011.16 Ladders.** Permanent ladders shall not serve as a part of the *means of egress* from occupied spaces within a building. Permanent ladders shall be constructed in accordance with Section 306.5 of the *International Mechanical Code* and designed for the live loads indicated in Section 1607.17 of the *International Building Code*. Permanent ladders shall be permitted to provide access to the following areas:

1. Spaces frequented only by personnel for maintenance, repair or monitoring of equipment.
2. Nonoccupiable spaces accessed only by catwalks, crawl spaces, freight elevators or very narrow passageways.
3. Raised areas used primarily for purposes of security, life safety or fire safety including, but not limited to, observation galleries, prison guard towers, fire towers or lifeguard stands.
4. Elevated levels in Group U not open to the general public.
5. Nonoccupied roofs that are not required to have *stairway* access in accordance with Section 1011.12.1.
6. Where permitted to access equipment and appliances in accordance with Section 306.5 of the *International Mechanical Code*.

\*

## SECTION 1012 RAMPS

**[W][BE] 1012.1 Scope.** The provisions of this section shall apply to *ramps* used as a component of a *means of egress*.

### Exceptions:

1. Ramped *aisles* within assembly rooms or spaces shall comply with the provisions in Section 1030.13.
2. Curb *ramps* shall comply with ICC A117.1.
3. Vehicle *ramps* in parking garages for pedestrian *exit access* shall not be required to comply with Sections 1012.3 through 1012.10 where they are not an *accessible route* serving accessible parking spaces, other required accessible elements or part of an *accessible means of egress*.
4. In a parking garage where one accessible means of egress serving accessible parking spaces or other accessible elements is provided, a second accessible means of egress serving that area shall be permitted to include a vehicle ramp that does not comply with Sections 1012.4, 1012.5 and 1012.8 of the International Building Code. A landing complying with Sections 1012.6.1 and 1012.6.4 of the International Building Code shall be provided at any change of direction in the accessible means of egress.

**[BE] 1012.2 Slope.** *Ramps* used as part of a *means of egress* shall have a running slope not steeper than 1 unit vertical in 12 units horizontal (8-percent slope). The slope of other pedestrian *ramps* shall not be steeper than 1 unit vertical in 8 units horizontal (12.5-percent slope).

**[BE] 1012.3 Cross slope.** The slope measured perpendicular to the direction of travel of a *ramp* shall not be steeper than 1 unit vertical in 48 units horizontal (2-percent slope).

**[BE] 1012.4 Vertical rise.** The rise for any *ramp* run shall be 30 inches (762 mm) maximum.

**[BE] 1012.5 Minimum dimensions.** The minimum dimensions of *means of egress ramps* shall comply with Sections 1012.5.1 through 1012.5.3.

**[BE] 1012.5.1 Width and capacity.** The minimum width and required capacity of a *means of egress ramp* shall be not less than that required for *corridors* by Section 1020.3. The clear width of a *ramp* between *handrails*, if provided, or other permissible projections shall be 36 inches (914 mm) minimum.

## SECTION 1013 EXIT SIGNS

[S][BE] **1013.1 Where required.** *Exits* and *exit access* doors shall be marked by an *approved* exit sign readily visible from any direction of egress travel. The path of egress travel to *exits* and within *exits* shall be marked by readily visible exit signs to clearly indicate the direction of egress travel in cases where the *exit* or the path of egress travel is not immediately visible to the occupants. Intervening *means of egress* doors within *exits* shall be marked by exit signs. Exit sign placement shall be such that any point in an *exit access corridor* or *exit passageway* is within 100 feet (30 480 mm) or the *listed* viewing distance of the sign, whichever is less, from the nearest visible exit sign. Exit signs shall be located at any other location determined by the building official to be necessary to clearly indicate the direction of egress.

### Exceptions:

1. Exit signs are not required in rooms or areas that require only one *exit* or *exit access* other than in buildings designed with a single exit stairway according to subsection 1006.3.4(7).
2. Main exterior *exit* doors or gates that are obviously and clearly identifiable as *exits* need not have *exit* signs where *approved* by the *fire code official*.
3. Exit signs are not required in occupancies in Group U and individual *sleeping units* or *dwelling units* in Group R-1, R-2 or R-3.
4. Exit signs are not required in dayrooms, sleeping rooms or dormitories in occupancies in Group I-3.
5. In occupancies in Groups A-4 and A-5, exit signs are not required on the seating side of vomitories or openings into seating areas where exit signs are provided in the concourse that are readily apparent from the vomitories. Egress lighting is provided to identify each vomitory or opening within the seating area in an emergency.
6. Exit signs are not required on exterior stairways serving exterior exit balconies.

[BE] **1013.2 Low-level exit signs in Group R-1.** Where exit signs are required in Group R-1 occupancies by Section 1013.1, additional low-level exit signs shall be provided in all areas serving guestrooms in Group R-1 occupancies and shall comply with Section 1013.5.

The bottom of the sign shall be not less than 10 inches (254 mm) nor more than 18 inches (455 mm) above the floor level. The sign shall be flush mounted to the door or wall. Where mounted on the wall, the edge of the sign shall be within 4 inches (102 mm) of the door frame on the latch side.

[BE] **1013.3 Illumination.** Exit signs shall be internally or externally illuminated.

**Exception:** Tactile signs required by Section 1013.4 need not be provided with illumination.

[BE] **1013.4 Raised character and braille exit signs.** Where exit signs are provided at an *area of refuge* with direct access to a *stairway*, an exterior area for assisted rescue, an *exit stairway* or ramp, an *exit passageway*, a *horizontal exit* and the *exit discharge*, a sign stating “EXIT” in visual characters, raised characters and braille and complying with ICC A117.1 shall be provided.

[BE] **1013.5 Internally illuminated exit signs.** Electrically powered, *self-luminous* and *photoluminescent exit* signs shall be *listed* and *labeled* in accordance with UL 924 and shall be installed in accordance with the manufacturer’s instructions and Section 1203. Exit signs shall be illuminated at all times.

[S][BE] **1013.6 Externally illuminated exit signs.** Externally illuminated exit signs shall comply with Sections 1013.6.1 through 1013.6.3.

[BE] **1013.6.1 Graphics.** Every exit sign and directional exit sign shall have plainly legible letters not less than 6 inches (152 mm) high with the principal strokes of the letters not less than 3/4 inch (19.1 mm) wide. The word “EXIT” shall have letters having a width not less than 2 inches (51 mm) wide, except the letter “I,” and the minimum spacing between letters shall be not less than 3/8 inch (9.5 mm). Signs larger than the minimum established in this section shall have letter widths, strokes and spacing in proportion to their height.

The word “EXIT” shall be in high contrast with the background and shall be clearly discernible when the means of exit sign illumination is or is not energized. If a chevron directional indicator is provided as part of the exit sign, the construction shall be such that the direction of the chevron directional indicator cannot be readily changed.

**Exception:** Existing exit signs with letters at least 5 inches (127 mm) in height are permitted to be reused.

[BE] **1013.6.2 Exit sign illumination.** The face of an exit sign illuminated from an external source shall have an intensity of not less than 5 footcandles (54 lux).

[BE] **1013.6.3 Power source.** Exit signs shall be illuminated at all times. To ensure continued illumination for a duration of not less than 90 minutes in case of primary power loss, the sign illumination means shall be connected to an emergency power system provided from storage batteries, unit equipment or an on-site generator. The installation of the emergency

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power system shall be in accordance with Section 1203. Group I-2, Condition 2 exit sign illumination shall not be provided by unit equipment batteries only.

**Exception:** *Approved* exit sign illumination types that provide continuous illumination independent of external power sources for a duration of not less than 90 minutes, in case of primary power loss, are not required to be connected to an emergency electrical system.

**[S] 1013.7 Not-an-exit warnings.** Placards reading “NOT AN EXIT” shall be installed at all doorways, passageways or stairways that are not exits, exit accesses or exit discharges, and that may be mistaken for an exit. A sign indicating the use of the doorway, passageway or stairway, such as “TO BASEMENT,” “STORE ROOM,” “LINEN CLOSET,” is permitted in lieu of the “NOT AN EXIT” sign.

## SECTION 1014 HANDRAILS

**[BE] 1014.1 Where required.** *Handrails* serving *flights* of *stairways*, *ramps*, *stepped aisles* and *ramped aisles* shall be adequate in strength and attachment in accordance with Section 1607.8 of the *International Building Code*. *Handrails* required for *flights of stairways* by Section 1011.11 shall comply with Sections 1014.2 through 1014.9. *Handrails* required for *ramps* by Section 1012.8 shall comply with Sections 1014.2 through 1014.8. *Handrails* for *stepped aisles* and *ramped aisles* required by Section 1030.16 shall comply with Sections 1014.2 through 1014.8.

**[W][BE] 1014.2 Height and location.** *Handrails* serving *flights* of *stairways*, *ramps*, *stepped aisles*, and *ramped aisles* shall comply with the provisions of Sections 1014.2.1 and 1014.2.2.

**1014.2.1 Height.** Handrail height, measured above *stair* tread *nosings*, or finish surface of *ramp* slope, shall be uniform, not less than 34 inches (864 mm) and not more than 38 inches (965 mm). *Handrail* height of *alternating tread devices* and ship’s ladders, measured above tread *nosings*, shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

### Exceptions:

1. Where handrail fittings or bendings are used to provide continuous transition between *flights*, the fittings or bendings shall be permitted to exceed the maximum height.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are associated with a Group R-3 occupancy or associated with individual *dwelling units* in Group R-2 occupancies; where handrail fittings or bendings are used to provide continuous transition between *flights*, transition at *winder* treads, transition from *handrail* to *guard*, or where used at the start of a *flight*, the *handrail* height at the fittings or bendings shall be permitted to exceed the maximum height.
3. *Handrails* on top of a *guard* where permitted along *stepped aisles* and *ramped aisles* in accordance with Section 1030.16.

**1014.2.2 Lateral location.** *Handrails* located outward from the edge of the walking surface of *flights* of *stairways*, *ramps*, *stepped aisles*, and *ramped aisles* shall be located within 6 inches (152.4 mm) measured horizontally from the edge of the walking surface. *Handrails* projecting into the width of the walking surface shall comply with Section 1014.8.

**[BE] 1014.3 Handrail graspability.** Required *handrails* shall comply with Section 1014.3.1 or shall provide equivalent graspability.

**Exception:** In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.3.1, Type II in accordance with Section 1014.3.2 or shall provide equivalent graspability.

**[BE] 1014.3.1 Type I.** *Handrails* with a circular cross section shall have an outside diameter of not less than 1-1/4 inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than 6-1/4 inches (160 mm) with a maximum cross-sectional dimension of 2-1/4 inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

**[BE] 1014.3.2 Type II.** *Handrails* with a perimeter greater than 6-1/4 inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of 3/4 inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than 5/16 inch (8 mm) within 7/8 inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than 3/8 inch (10 mm) to a level that is not less than 1-3/4 inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than 1-1/4 inches (32 mm) to not greater than 2-3/4 inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

**[BE] 1014.4 Continuity.** Handrail gripping surfaces shall be continuous, without interruption by newel posts or other obstructions.

**Exceptions:**

1. *Handrails* within *dwelling units* are permitted to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. Handrail brackets or balusters attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within 1-1/2 inches (38 mm) of the bottom of the *handrail* shall not be considered obstructions. For each 1/2 inch (12.7 mm) of additional *handrail* perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of 1-1/2 inches (38 mm) shall be permitted to be reduced by 1/8 inch (3.2 mm).
4. Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper guards.
5. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

**[BE] 1014.5 Fittings.** *Handrails* shall not rotate within their fittings.

**[BE] 1014.6 Handrail extensions.** *Handrails* shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent *flight* of *stairs* or *ramp* run. Where *handrails* are not continuous between *flights* the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of *handrails* shall be in the same direction of the *flights* of *stairs* at *stairways* and the *ramp* runs at *ramps*.

**Exceptions:**

1. *Handrails* within a *dwelling unit* that is not required to be accessible need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ship's ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between *flights* or to extend beyond the top or bottom risers.

**[BE] 1014.7 Clearance.** Clear space between a *handrail* and a wall or other surface shall be not less than 1-1/2 inches (38 mm). A *handrail* and a wall or other surface adjacent to the *handrail* shall be free of any sharp or abrasive elements.

**[W][BE] 1014.8 Projections.** On *ramps* and on ramped *aisles* that are part of an *accessible route*, the clear width between *handrails* shall be 36 inches (914 mm) minimum. Projections into the required width of stepped and ramped aisles, stairways and ramps at each side shall not exceed 4-1/2 inches (114 mm) at or below the *handrail* height. Projections into the required width shall not be limited above the minimum headroom height required in Section 1011.3. Projections due to intermediate *handrails* shall not constitute a reduction in the egress width. Where a pair of intermediate *handrails* are provided within the *stairway* width without a walking surface between the pair of intermediate *handrails* and the distance between the pair of intermediate *handrails* is greater than 6 inches (152 mm), the available egress width shall be reduced by the distance between the closest edges of each such intermediate pair of *handrails* that is greater than 6 inches (152 mm).

**[BE] 1014.9 Intermediate handrails.** *Stairways* shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*. On monumental *stairs*, *handrails* shall be located along the most direct path of egress travel.

## SECTION 1015 GUARDS

**[BE] 1015.1 General.** *Guards* shall comply with the provisions of Sections 1015.2 through 1015.7. Operable windows with sills located more than 72 inches (1829 mm) above finished grade or other surface below shall comply with Section 1015.8.

**[W][BE] 1015.2 Where required.** *Guards* shall be located along open-sided walking surfaces, including *mezzanines*, equipment platforms, lofts in accordance with Section 420.14 of the International Building Code, *aisles, stairs, ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Guards shall be provided at the perimeter of the occupied portions of an occupied roof. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.8 of the *International Building Code*.

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**Exception:** *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including *stairs* leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, *ramps* and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an occupied roof located less than 30 inches measured vertically to adjacent unoccupied roof areas when approved guards are present at the perimeter of the roof.
10. At an occupied portion of an occupied roof where a barrier approved by the building official is provided.

**[BE] 1015.2.1 Glazing.** Where glass is used to provide a *guard* or as a portion of the *guard* system, the *guard* shall comply with Section 2407 of the *International Building Code*. Where the glazing provided does not meet the strength and attachment requirements of Section 1607.8 of the *International Building Code*, complying *guards* shall be located along glazed sides of open-sided walking surfaces.

**[W][BE] 1015.3 Height.** Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the leading edges of the tread *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the *guard*.

### Exceptions:

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three stories above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
4. In areas with ceiling heights of 7 feet (2134 mm) or less in lofts constructed in accordance with Section 420.14 of the International Building Code, guards shall not be less than 36 inches (914 mm) in height or one-half of the clear height from the loft floor to the loft ceiling, whichever is less.

((4)) 5. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.

((5)) 6. Along *alternating tread devices* and ship's ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread  *nosing*.

((6)) 7. In Group F occupancies where *exit access stairways* serve fewer than three stories and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

**[BE] 1015.4 Opening limitations.** Required *guards* shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter from the walking surface to the required *guard* height.

### Exceptions:

1. From a height of 36 inches (914 mm) to 42 inches (1067 mm), *guards* shall not have openings that allow passage of a sphere 4-3/8 inches (111 mm) in diameter.
2. The triangular openings at the open sides of a *stair*, formed by the riser, tread and bottom rail shall not allow passage of a sphere 6 inches (152 mm) in diameter.



3. At elevated walking surfaces for access to and use of electrical, mechanical or plumbing systems or equipment, *guards* shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.
4. In areas that are not open to the public within occupancies in Group I-3, F, H or S, and for *alternating tread devices* and ship's ladders, *guards* shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.
5. In assembly seating areas, *guards* required at the end of *aisles* in accordance with Section 1030.17.4 shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter up to a height of 26 inches (660 mm). From a height of 26 inches (660 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, *guards* shall not have openings that allow passage of a sphere 8 inches (203 mm) in diameter.
6. Within individual *dwelling units* and *sleeping units* in Group R-2 and R-3 occupancies, *guards* on the open sides of *stairs* shall not have openings that allow passage of a sphere 4-3/8 (111 mm) inches in diameter.

**[BE] 1015.5 Screen porches.** Porches and decks that are enclosed with insect screening shall be provided with *guards* where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

**[S][BE] 1015.6 (~~Mechanical equipment~~) Equipment, systems and devices.** *Guards* shall be provided where various components that require service are located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below. The *guard* shall extend not less than 30 inches (762 mm) beyond each end of such components. The *guard* shall be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter.

**Exception:** *Guards* are not required where personal fall arrest anchorage connector devices that comply with ANSI/ASSE Z359.1 are installed.

**[S][BE] 1015.7 Roof access.** *Guards* shall be provided where the roof hatch opening is located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below. The *guard* shall extend not less than 30 inches (762 mm) beyond each end of the hatch parallel to the roof edge. The *guard* shall be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter.

~~(**Exception:** *Guards* are not required where personal fall arrest anchorage connector devices that comply with ANSI/ASSE Z359.1 are installed.))~~

**[BE] 1015.8 Window openings.** Windows in Group R-2 and R-3 buildings including *dwelling units*, where the bottom of the clear opening of an operable window is located less than 36 inches (914 mm) above the finished floor and more than 72 inches (1829 mm) above the finished grade or other surface below on the exterior of the building, shall comply with one of the following:

1. Operable windows where the top of the sill of the opening is located more than 75 feet (22 860 mm) above the finished grade or other surface below and that are provided with window fall prevention devices that comply with ASTM F2006.
2. Operable windows where the openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the window is in its largest opened position.
3. Operable windows where the openings are provided with window fall prevention devices that comply with ASTM F2090.
4. Operable windows that are provided with window opening control devices that comply with Section 1015.8.1.

**[BE] 1015.8.1 Window opening control devices.** Window opening control devices shall comply with ASTM F2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1031.3.1.

## SECTION 1016 EXIT ACCESS

**[BE] 1016.1 General.** The *exit access* shall comply with the applicable provisions of Sections 1003 through 1015. *Exit access* arrangement shall comply with Sections 1016 through 1021.

**[S][BE] 1016.2 Egress through intervening spaces.** Egress through intervening spaces shall comply with this section.

1. *Exit access* through an enclosed elevator lobby is permitted. Where access to two or more *exits* or *exit access doorways* is required in Section 1006.2.1, access to not less than one of the required *exits* shall be provided without travel through the enclosed elevator lobbies required by Section (~~1006~~) 713.14 of the *International Building Code*. Where the path of *exit access* travel passes through an enclosed elevator lobby the level of protection required for the enclosed elevator lobby is not required to be extended to the *exit* unless direct access to an *exit* is required by other sections of this code.

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2. Egress from a room or space shall not pass through adjoining or intervening rooms or areas, except where such adjoining rooms or areas and the area served are accessory to one or the other, are not a Group H occupancy and provide a discernible path of egress travel to an *exit*.

**Exception:** *Means of egress* are not prohibited through adjoining or intervening rooms or spaces in a Group H, S or F occupancy where the adjoining or intervening rooms or spaces are the same or a lesser hazard occupancy group.

3. An *exit access* shall not pass through a room that can be locked to prevent egress.
4. *Means of egress* from *dwelling units* or sleeping areas shall not lead through other sleeping areas, toilet rooms or bathrooms.
5. Egress shall not pass through kitchens, storage rooms, closets or spaces used for similar purposes.

### Exceptions:

1. *Means of egress* are not prohibited through a kitchen area serving adjoining rooms constituting part of the same *dwelling unit* or *sleeping unit*.
2. *Means of egress* are not prohibited through stockrooms in Group M occupancies where all of the following are met:
  - 2.1. The stock is of the same hazard classification as that found in the main retail area.
  - 2.2. Not more than 50 percent of the *exit access* is through the stockroom.
  - 2.3. The stockroom is not subject to locking from the egress side.
  - 2.4. There is a demarcated, minimum 44-inch-wide (1118 mm) *aisle* defined by full- or partial-height fixed walls or similar construction that will maintain the required width and lead directly from the retail area to the *exit* without obstructions.

6. Unless approved by the building official, where two or more exits are required, exit travel shall not pass through an interior exit stairway as the only way to reach another exit.

**Note:** See Section 1010.2.4 for conditions in which exit access doors from elevator lobbies are permitted to be locked.

**[BE] 1016.2.1 Multiple tenants.** Where more than one tenant occupies any one floor of a building or structure, each tenant space, *dwelling unit* and *sleeping unit* shall be provided with access to the required *exits* without passing through adjacent tenant spaces, *dwelling units* and *sleeping units*.

**Exception:** The *means of egress* from a smaller tenant space shall not be prohibited from passing through a larger adjoining tenant space where such rooms or spaces of the smaller tenant occupy less than 10 percent of the area of the larger tenant space through which they pass; are the same or similar occupancy group; a discernible path of egress travel to an *exit* is provided; and the *means of egress* into the adjoining space is not subject to locking from the egress side. A required *means of egress* serving the larger tenant space shall not pass through the smaller tenant space or spaces.

## SECTION 1017 EXIT ACCESS TRAVEL DISTANCE

**[BE] 1017.1 General.** Travel distance within the *exit access* portion of the *means of egress* system shall be in accordance with this section.

**Note:** Additional interior exit stairways or corridors constructed as smoke barriers may be required for standpipe hose connections. See Section 905.4.

**[BE] 1017.2 Limitations.** *Exit access* travel distance shall not exceed the values given in Table 1017.2.

**[W][S][BE] TABLE 1017.2  
EXIT ACCESS TRAVEL DISTANCE<sup>a</sup>**

OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)	WITH SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200	250 <sup>b, c</sup>
I-1	Not Permitted	250 <sup>b</sup>
B	200	300 <sup>c</sup>
F-2, S-2, U	300	400 <sup>c</sup>
H-1	Not Permitted	75 <sup>d</sup>
H-2	Not Permitted	100 <sup>d</sup>
H-3	Not Permitted	150 <sup>d</sup>
H-4	Not Permitted	175 <sup>d</sup>
H-5	Not Permitted	200 <sup>c</sup>
I-2, I-3	Not Permitted	200 <sup>c</sup>
I-4	150	200 <sup>c</sup>

For SI: 1 foot = 304.8 mm.

a. See the following sections for modifications to exit access travel distance requirements:

Section 402.8 of the *International Building Code*: For the distance limitation in malls.

Section 407.4 of the *International Building Code*: For the distance limitation in Group I-2.

Sections 408.6.1 and 408.8.1 of the *International Building Code*: For the distance limitations in Group I-3.

Section 411.2 of the *International Building Code*: For the distance limitation in special amusement areas.

Section 412.6 of the *International Building Code*: For the distance limitations in aircraft manufacturing facilities.

Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.

Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.

Section 1006.3.4: For buildings with one exit.

Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.

Section 1030.7: For increased limitation in assembly seating.

(Section 3103.4 of the *International Building Code*: For temporary structures.)

Section 3104.9 of the *International Building Code*: For pedestrian walkways.

Section 4901: For fixed guideways and passenger rail stations.

b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

d. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.1.

e. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

**[BE] 1017.2.1 Exterior egress balcony increase.** *Exit access* travel distances specified in Table 1017.2 shall be increased up to an additional 100 feet (30 480 mm) provided that the last portion of the *exit access* leading to the *exit* occurs on an exterior egress balcony constructed in accordance with Section 1021. The length of such balcony shall be not less than the amount of the increase taken.

**[BE] 1017.2.2 Groups F-1 and S-1 increase.** The maximum *exit access* travel distance shall be 400 feet (122 m) in Group F-1 or S-1 occupancies where all of the following conditions are met:

1. The portion of the building classified as Group F-1 or S-1 is limited to one story in height.
2. The minimum height from the finished floor to the bottom of the ceiling or roof slab or deck is 24 feet (7315 mm).
3. The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

**[BE] 1017.3 Measurement.** *Exit access* travel distance shall be measured from the most remote point of each room, area or space along the natural and unobstructed path of horizontal and vertical egress travel to the entrance to an *exit*. Where more than one *exit* is required, *exit access* travel distance shall be measured to the nearest *exit*.

**Exceptions:**

1. In open parking garages, *exit access* travel distance is permitted to be measured to the closest riser of an *exit access stairway* or the closest slope of an *exit access ramp*.
2. In smoke-protected seating and open-air assembly seating, *exit access* travel distance shall be measured in accordance with Section 1030.7.

**[BE] 1017.3.1 Exit access stairways and ramps.** Travel distance on *exit access stairways* or *ramps* shall be included in the *exit access* travel distance measurement. The measurement along *stairways* shall be made on a plane parallel and tangent to

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the *stair tread nosings* in the center of the *stair* and landings. The measurement along *ramps* shall be made on the walking surface in the center of the *ramp* and landings.

**1017.3.2 Atriums.** *Exit access* travel distance for areas open to an atrium shall comply with the requirements of Sections 1017.3.2.1 through 1017.3.2.3.

**1017.3.2.1 Egress not through the atrium.** Where required access to the *exits* is not through the atrium, *exit access* travel distance shall comply with Section 1017.2.

**1017.3.2.2 Exit access travel distance at the level of exit discharge.** Where the path of egress travel is through an atrium space, *exit access* travel distance at the *level of exit discharge* shall be determined in accordance with Section 1017.2.

**1017.3.2.3 Exit access travel distance at other than the level of exit discharge.** Where the path of egress travel is not at the *level of exit discharge* from the atrium, that portion of the total permitted *exit access* travel distance that occurs within the atrium shall be not greater than 200 feet (60 960 mm).

## SECTION 1018 AISLES

[BE] **1018.1 General.** *Aisles* and *aisle accessways* serving as a portion of the *exit access* in the *means of egress* system shall comply with the requirements of this section. *Aisles* or *aisle accessways* shall be provided from all occupied portions of the *exit access* that contain seats, tables, furnishings, displays and similar fixtures or equipment. The minimum width or required capacity of *aisles* shall be unobstructed.

**Exception:** Encroachments complying with Section 1005.7.

[BE] **1018.2 Aisles in assembly spaces.** *Aisles* and *aisle accessways* serving a room or space used for assembly purposes shall comply with Section 1030.

[BE] **1018.3 Aisles in Groups B and M.** In Group B and M occupancies, the minimum clear *aisle* width shall be determined by Section 1005.1 for the *occupant load* served, but shall be not less than that required for *corridors* by Section 1020.3.

**Exception:** Nonpublic *aisles* serving less than 50 people and not required to be accessible by Chapter 11 of the *International Building Code* need not exceed 28 inches (711 mm) in width.

[BE] **1018.4 Aisle accessways in Group M.** An *aisle accessway* shall be provided on not less than one side of each element within the *merchandise pad*. The minimum clear width for an *aisle accessway* not required to be accessible shall be 30 inches (762 mm). The required clear width of the *aisle accessway* shall be measured perpendicular to the elements and merchandise within the *merchandise pad*. The 30-inch (762 mm) minimum clear width shall be maintained to provide a path to an adjacent *aisle* or *aisle accessway*. The *common path of egress travel* shall not exceed 30 feet (9144 mm) from any point in the *merchandise pad*.

**Exception:** For areas serving not more than 50 occupants, the *common path of egress travel* shall not exceed 75 feet (22 860 mm).

[BE] **1018.5 Aisles in other than assembly spaces and Groups B and M.** In other than rooms or spaces used for assembly purposes and Group B and M occupancies, the minimum clear *aisle* capacity shall be determined by Section 1005.1 for the *occupant load* served, but the width shall be not less than that required for *corridors* by Section 1020.3.

**Exception:** Nonpublic *aisles* serving less than 50 people and not required to be accessible by Chapter 11 of the *International Building Code* need not exceed 28 inches (711 mm) in width.

## SECTION 1019 EXIT ACCESS STAIRWAYS AND RAMPS

[BE] **1019.1 General.** *Exit access stairways* and *ramps* serving as an *exit access* component in a *means of egress* system shall comply with the requirements of this section. The number of stories connected by *exit access stairways* and *ramps* shall include *basements*, but not *mezzanines*.

[BE] **1019.2 All occupancies.** *Exit access stairways* and *ramps* that serve floor levels within a single story are not required to be enclosed.

[S][BE] **1019.3 Occupancies other than Groups I-2 and I-3.** In other than Group I-2 and I-3 occupancies, floor openings containing *exit access stairways* or *ramps* shall be enclosed with a shaft enclosure constructed in accordance with Section 713 of the *International Building Code*.

**Exceptions:**

1. *Exit access stairways* and *ramps* that serve or atmospherically communicate between only two adjacent stories. Such interconnected stories shall not be open to other stories.
2. In Group R-1, R-2 or R-3 occupancies, *exit access stairways* and *ramps* connecting four stories serving and contained within an individual *dwelling unit* or *sleeping unit* or live/work unit.
3. *Exit access stairways* serving and contained within a Group R-3 congregate residence or a Group R-4 facility are not required to be enclosed.
4. *Exit access stairways* and *ramps* that are designed exclusively for circulation in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the *stairway* or *ramp* and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Group B and M occupancies, this provision is limited to openings that do not connect more than four stories.
5. *Exit access stairways* and *ramps* within an atrium complying with the provisions of Section 404 of the *International Building Code*.
6. *Exit access stairways* and *ramps* in open parking garages that serve only the parking garage.
7. *Exit access stairways* and *ramps* serving smoke-protected or open-air assembly seating complying with the *exit access* travel distance requirements of Section 1030.7.
8. *Exit access stairways* and *ramps* between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.
9. Exterior *exit access stairways* or *ramps* between occupied roofs.

**[BE] 1019.4 Group I-2 and I-3 occupancies.** In Group I-2 and I-3 occupancies, floor openings between stories containing *exit access stairways* or *ramps* are required to be enclosed with a shaft enclosure constructed in accordance with Section 713 of the *International Building Code*.

**Exception:** In Group I-3 occupancies, *exit access stairways* or *ramps* constructed in accordance with Section 408 of the *International Building Code* are not required to be enclosed.

## SECTION 1020 CORRIDORS

**[BE] 1020.1 General.** *Corridors* serving as an *exit access* component in a *means of egress* system shall comply with the requirements of Sections 1020.2 and 1020.7.

**[S][BE] 1020.2 Construction.** *Corridors* shall be *fire-resistance rated* in accordance with Table 1020.2. The *corridor* walls required to be *fire-resistance rated* shall comply with Section 708 of the *International Building Code* for *fire partitions*.

**Exceptions:**

1. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group E where each room that is used for instruction has not less than one door opening directly to the exterior and rooms for assembly purposes have not less than one-half of the required *means of egress* doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.
2. A *fire-resistance rating* is not required for *corridors* contained within a *dwelling unit* or *sleeping unit* in an occupancy in Groups I-1 and R.
3. A *fire-resistance rating* is not required for *corridors* in open parking garages.
4. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group B that is a space requiring only a single *means of egress* complying with Section 1006.2.
5. *Corridors* adjacent to the *exterior walls* of buildings shall be permitted to have unprotected openings on unrated *exterior walls* where unrated walls are permitted by Table 705.5 of the *International Building Code* and unprotected openings are permitted by Table 705.8 of the *International Building Code*.
6. In office areas located in buildings of Type IA or IB construction, corridor walls need not be of fire-resistance-rated construction where the corridor side of the corridor walls is finished with materials having a maximum Class B rating as defined in Chapter 8. This exception does not apply to outpatient clinics and medical offices.
7. The occupant load of Group B conference rooms, lunch rooms without grease-producing cooking and other assembly rooms with an occupant load of less than 50 in each room need not be considered when determining whether corridor construction is required, provided such rooms are accessory to an office tenant located in a building of Type IA or IB construction. This provision is permitted to be used in other construction types when the floor on which the assembly room is located is equipped with an automatic sprinkler system.

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**[S][BE] 1020.2.1 Hoistway opening protection.** Elevator hoistway openings shall be protected in accordance with Section ~~(3006.2.1)~~ 713.14.2.1 of the *International Building Code*.

**[S][BE] TABLE 1020.2  
CORRIDOR FIRE-RESISTANCE RATING**

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system
H-1, H-2, H-3	All	Not Permitted	1 <sup>c</sup>
H-4, H-5	Greater than 30	Not Permitted	1 <sup>c</sup>
A, B, E, F, M, S, U	Greater than 30	1	0
R	<del>((Greater than 10))</del> <u>All</u>	Not Permitted	<del>((0.5<sup>e</sup>))</del> 1 <sup>d</sup>
I-2 <sup>a</sup>	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1 <sup>b, c</sup>
I-4	All	1	0

- a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3 of the *International Building Code*.
- b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8 of the *International Building Code*.
- c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.
- d. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

**[BE] 1020.3 Width and capacity.** The required capacity of *corridors* shall be determined as specified in Section 1005.1, but the minimum width shall be not less than that specified in Table 1020.3.

**Exception:** In Group I-2 occupancies, *corridors* are not required to have a clear width of 96 inches (2438 mm) in areas where there will not be stretcher or bed movement for access to care or as part of the defend-in-place strategy.

**[BE] TABLE 1020.3  
MINIMUM CORRIDOR WIDTH**

OCCUPANCY	MINIMUM WIDTH (inches)
Any facility not listed below	44
Access to and utilization of mechanical, plumbing or electrical systems or equipment	24
With an occupant load of less than 50	36
Within a dwelling unit	36
In Group E with a corridor having a occupant load of 100 or more	72
In corridors and areas serving stretcher traffic in ambulatory care facilities	72
Group I-2 in areas where required for bed movement	96

For SI: 1 inch = 25.4 mm.

**[BE] 1020.4 Obstruction.** The minimum width or required capacity of *corridors* shall be unobstructed.

**Exception:** Encroachments complying with Section 1005.7.

**[W][S][BE] 1020.5 Dead ends.** Where more than one *exit* or *exit access doorway* is required, the *exit access* shall be arranged such that dead-end *corridors* do not exceed ~~((20 feet (6096 mm)))~~ 25 feet (7620 mm) in length.

**Exceptions:**

1. In Group I-3, Condition 2, 3 or 4 occupancies, the dead end in a *corridor* shall not exceed 50 feet (15 240 mm).
2. In occupancies in Groups B, E, F, I-1, M, R-1, R-2, S and U, where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the length of the dead-end *corridors* shall not exceed 50 feet (15 240 mm).
3. A dead-end *corridor* shall not be limited in length where the length of the dead-end *corridor* is less than 2.5 times the least width of the dead-end *corridor*.
4. In Group I-2, Condition 2 occupancies, the length of dead-end *corridors* that do not serve patient rooms or patient treatment spaces shall not exceed 30 feet (9144 mm).
5. Dead ends are permitted to be 75 feet (22 860 mm) in length in areas containing Group B offices in buildings of Types IA and IB construction, where the cumulative occupant load does not exceed 50 for all areas for which the dead end serves as the only means of egress.

[S][BE] **1020.6 Air movement in corridors.** *Corridors* shall not serve as supply, return, exhaust, relief or ventilation air ducts or plenums as allowed by *International Mechanical Code* Section 601.2.

**~~((Exceptions:~~**

- ~~1. Use of a *corridor* as a source of makeup air for exhaust systems in rooms that open directly onto such *corridors*, including toilet rooms, bathrooms, dressing rooms, smoking lounges and janitor closets, shall be permitted, provided that each such *corridor* is directly supplied with outdoor air at a rate greater than the rate of makeup air taken from the *corridor*.~~
- ~~2. Where located within a *dwelling unit*, the use of *corridors* for conveying return air shall not be prohibited.~~
- ~~3. Where located within tenant spaces of 1,000 square feet (93 m<sup>2</sup>) or less in area, utilization of *corridors* for conveying return air is permitted.~~
- ~~4. Transfer air movement required to maintain the pressurization difference within health care facilities in accordance with ASHRAE 170-))~~

[BE] **1020.6.1 Corridor ceiling.** Use of the space between the *corridor* ceiling and the floor or roof structure above as a return air plenum is permitted for one or more of the following conditions:

1. The *corridor* is not required to be of *fire-resistance-rated* construction.
2. The *corridor* is separated from the plenum by *fire-resistance-rated* construction.
3. The air-handling system serving the *corridor* is shut down upon activation of the air-handling unit smoke detectors required by the *International Mechanical Code*.
4. The air-handling system serving the *corridor* is shut down upon detection of sprinkler water flow where the building is equipped throughout with an *automatic sprinkler system*.
5. The space between the *corridor* ceiling and the floor or roof structure above the *corridor* is used as a component of an *approved* engineered smoke control system.

[BE] **1020.7 Corridor continuity.** *Fire-resistance-rated corridors* shall be continuous from the point of entry to an *exit*, and shall not be interrupted by intervening rooms. Where the path of egress travel within a *fire-resistance-rated corridor* to the *exit* includes travel along unenclosed *exit access stairways* or *ramps*, the *fire-resistance-rating* shall be continuous for the length of the *stairway* or *ramp* and for the length of the connecting *corridor* on the adjacent floor leading to the *exit*.

**Exceptions:**

1. Foyers, lobbies or reception rooms constructed as required for *corridors* shall not be construed as intervening rooms.
2. Enclosed elevator lobbies as permitted by Item 1 of Section 1016.2 shall not be construed as intervening rooms.

**SECTION 1021  
EGRESS BALCONIES**

[BE] **1021.1 General.** Balconies used for egress purposes shall conform to the same requirements as *corridors* for minimum width, required capacity, headroom, dead ends and projections.

[S][BE] **1021.2 Wall separation.** Exterior egress balconies shall be separated from the interior of the building by walls and opening protectives as required for *corridors*.

**Exceptions:**

1. Separation is not required where the exterior egress balcony is served by not less than two *stairways* and a dead-end travel condition does not require travel past an unprotected opening to reach a *stairway*.
2. Separation is not required in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

[BE] **1021.3 Openness.** The long side of an egress balcony shall be not less than 50 percent open, and the open area above the guards shall be so distributed as to minimize the accumulation of smoke or toxic gases.

[BE] **1021.4 Location.** Exterior egress balconies shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the egress balcony to the following:

1. Adjacent lot lines.
2. Other portions of the building.
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 of the *International Building Code* based on *fire separation distance*.

For the purposes of this section, other portions of the building shall be treated as separate buildings.

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### SECTION 1022 EXITS

**[BE] 1022.1 General.** *Exits* shall comply with Sections 1022 through 1027 and the applicable requirements of Sections 1003 through 1015. An *exit* shall not be used for any purpose that interferes with its function as a *means of egress*. Once a given level of *exit* protection is achieved, such level of protection shall not be reduced until arrival at the *exit discharge*. *Exits* shall be continuous from the point of entry into the *exit* to the *exit discharge*.

**[BE] 1022.2 Exterior exit doors.** Buildings or structures used for human occupancy shall have not less than one exterior door that meets the requirements of Section 1010.1.1.

**[BE] 1022.2.1 Detailed requirements.** Exterior exit doors shall comply with the applicable requirements of Section 1010.1.

**[BE] 1022.2.2 Arrangement.** Exterior exit doors shall lead directly to the *exit discharge* or the *public way*.

### SECTION 1023 INTERIOR EXIT STAIRWAYS AND RAMPS

**[BE] 1023.1 General.** *Interior exit stairways* and *ramps* serving as an *exit* component in a *means of egress* system shall comply with the requirements of this section. *Interior exit stairways* and *ramps* shall be enclosed and lead directly to the exterior of the building or shall be extended to the exterior of the building with an *exit passageway* conforming to the requirements of Section 1024, except as permitted in Section 1028.2. An *interior exit stairway* or *ramp* shall not be used for any purpose other than as a *means of egress* and a circulation path.

**[S][BE] 1023.2 Construction.** Enclosures for *interior exit stairways* and *ramps* shall be constructed as *fire barriers* in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both. *Interior exit stairway* and *ramp* enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting more than four stories (~~(or more)~~) and not less than 1 hour where connecting (~~(less than)~~) four stories or less. The number of stories connected by the *interior exit stairways* or *ramps* shall include any *basements*, but not any *mezzanines*. Enclosure for *interior exit stairways* and *ramps* shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours.

#### Exceptions:

1. *Interior exit stairways* and *ramps* in Group I-3 occupancies in accordance with the provisions of Section 408.3.8 of the *International Building Code*.
2. *Interior exit stairways* within an atrium enclosed in accordance with Section 404.6 of the *International Building Code*.
3. *Interior exit stairways* in accordance with Section 510.2 of the *International Building Code*.

**[BE] 1023.3 Termination.** *Interior exit stairways* and *ramps* shall terminate at an *exit discharge* or a *public way*.

**Exception:** A combination of *interior exit stairways*, *interior exit ramps* and *exit passageways*, constructed in accordance with Sections 1023.2, 1023.3.1 and 1024, respectively, and forming a continuous protected enclosure, shall be permitted to extend an *interior exit stairway* or *ramp* to the *exit discharge* or a *public way*.

**[S][BE] 1023.3.1 Extension.** Where *interior exit stairways* and *ramps* are extended to an *exit discharge* or a *public way* by an *exit passageway*, the *interior exit stairway* and *ramp* shall be separated from the *exit passageway* by a *fire barrier* constructed in accordance with Section 707 of the *International Building Code* or a *horizontal assembly* constructed in accordance with Section 711 of the *International Building Code*, or both. The *fire-resistance rating* shall be not less than that required for the *interior exit stairway* and *ramp*. A *fire door* assembly complying with Section 716 of the *International Building Code* shall be installed in the *fire barrier* to provide a *means of egress* from the *interior exit stairway* and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door* assembly are prohibited. Penetrations of the *fire barrier* are prohibited.

#### Exceptions:

1. Penetrations of the *fire barrier* in accordance with Section 1023.5 shall be permitted.
2. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where there are no openings into the *exit passageway* extension.
3. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where the *interior exit stairway* and the *exit passageway* extension are pressurized in accordance with Section 909.20.5 of the *International Building Code*.

**[BE] 1023.4 Openings.** *Interior exit stairway* and *ramp* opening protectives shall be in accordance with the requirements of Section 716 of the *International Building Code*.



Openings in *interior exit stairways* and *ramps* other than unprotected exterior openings shall be limited to those required for *exit access* to the enclosure from normally occupied spaces and for egress from the enclosure.

Elevators shall not open into *interior exit stairways* and *ramps*.

**[S][BE] 1023.5 Penetrations.** Penetrations into or through *interior exit stairways* and *ramps* are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization.
2. *Fire protection systems*.
3. Security systems.
4. Two-way communication systems.
5. Electrical raceway for fire department communication systems and sprinkler monitoring terminating at a steel box not exceeding 16 square inches (0.010 m<sup>2</sup>).
6. Electrical raceway serving the *interior exit stairway* and *ramp* and terminating at a steel box not exceeding 16 square inches (0.010 m<sup>2</sup>).
7. Structural elements supporting the *interior exit stairway* or *ramp* or enclosure, such as beams or joists.
8. Piping used exclusively for the drainage of rainfall runoff from roof areas, provided the roof is not used for a helistop or heliport.
9. Unfired unit heaters required for freeze protection of fire protection equipment are permitted to penetrate one membrane; the conduit serving the equipment is permitted to penetrate both membranes.
10. Equipment necessary for electrically controlled stairway door locks and security cameras are permitted to penetrate one membrane; the conduit serving the equipment is permitted to penetrate both membranes.

Such penetrations shall be protected in accordance with Section 714 of the *International Building Code*. There shall not be penetrations or communication openings, whether protected or not, between adjacent *interior exit stairways* and *ramps*.

**Exception:** Membrane penetrations shall be permitted on the outside of the *interior exit stairway* and *ramp*. Such penetrations shall be protected in accordance with Section 714.4.2 of the *International Building Code*.

**Interpretation I1023.5:** Accessory rooms such as restrooms, storage closets, laundry rooms, electrical, communication closets, mechanical rooms and similar spaces shall not open directly into an *exit passageway*. Rooms and spaces that are separated from the *exit passageway* by a *corridor* or a vestibule are not considered to open directly into the *exit passageway*. The *corridor* or vestibule shall be constructed as a minimum 1-hour fire-resistance rated fire partition complying with IBC Section 708. Openings shall comply with IBC Sections 716.2.2.1 and 716.3.2.1.

**Code Alternate CA1023.5:** An elevator is permitted to open into an *exit passageway* when the following conditions are met:

1. A lobby shall separate the elevator from the *exit passageway*. This is allowed at only one location in the building. The lobby is required whether the elevator hoistway is pressurized or not.
  2. The separation shall be constructed as a fire barrier having a fire-resistive rating and opening protectives as for the *exit passageway*. The door between the lobby and the *exit passageway* shall also comply with Section 716.5.3. The door shall have listed gaskets installed at head, jambs and meeting edges. This only applies to the walls common with the *exit passageway*.
  3. The lobby shall have a minimum depth of 36 inches (914 mm). (Note that areas of refuge may require a larger dimension).
  4. An elevator lobby constructed as a smoke partition shall be provided at every floor below the level of the *exit passageway* served by the elevator. Hoistway pressurization is permitted to be used in lieu of the lobbies on floors below the level of the *exit passageway*.
  5. A door as required by Section 1023.3.1 between an interior exit stairway and the *exit passageway* shall be provided.
  6. An automatic sprinkler system in accordance with Section 903.3.1.1 shall be provided throughout the floor on which the *exit passageway* is located.
- This alternate does not apply to interior exit stairways.

**[BE] 1023.6 Ventilation.** Equipment and ductwork for *interior exit stairway* and *ramp* ventilation as permitted by Section 1023.5 shall comply with one of the following items:

1. Such equipment and ductwork shall be located exterior to the building and shall be directly connected to the *interior exit stairway* and *ramp* by ductwork enclosed in construction as required for shafts.

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2. Where such equipment and ductwork is located within the *interior exit stairway* and *ramp*, the intake air shall be taken directly from the outdoors and the exhaust air shall be discharged directly to the outdoors, or such air shall be conveyed through ducts enclosed in construction as required for shafts.
3. Where located within the building, such equipment and ductwork shall be separated from the remainder of the building, including other mechanical equipment, with construction as required for shafts.

In each case, openings into the *fire-resistance-rated* construction shall be limited to those needed for maintenance and operation and shall be protected by opening protectives in accordance with Section 716 of the *International Building Code* for shaft enclosures.

The *interior exit stairway* and *ramp* ventilation systems shall be independent of other building ventilation systems.

**[BE] 1023.7 Interior exit stairway and ramp exterior walls.** Exterior walls of the *interior exit stairway* or *ramp* shall comply with the requirements of Section 705 of the *International Building Code* for *exterior walls*. Where nonrated walls or unprotected openings enclose the exterior of the *stairway* or *ramps* and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the building *exterior walls* within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a *fire-resistance rating* of not less than 1 hour. Openings within such *exterior walls* shall be protected by opening protectives having a *fire protection rating* of not less than 3/4 hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the *stairway* or *ramp*, or to the roof line, whichever is lower.

**[BE] 1023.8 Barriers at level of exit discharge.** An *interior exit stairway* and *ramp* shall not continue below its *level of exit discharge* unless an *approved* barrier is provided at the *level of exit discharge* to prevent persons from unintentionally continuing into levels below. Directional exit signs shall be provided as specified in Section 1013.

**[S][BE] 1023.9 Stairway identification signs.** A sign shall be provided at each floor landing in an *interior exit stairway* and *ramp* connecting more than three stories designating the floor level, the terminus of the top and bottom of the *interior exit stairway* and *ramp* and the identification of the *stairway* or *ramp*. The signage shall state the story of, and the direction to, the *exit discharge* and ~~((the availability of))~~ whether there is roof access from the *interior exit stairway* and *ramp* for the fire department, and whether the roof access is accessed by roof hatch. The bottom of the sign shall be located not less than 5 feet (1524 mm) above the floor landing in a position that is readily visible when the doors are in the open and closed positions.

**[BE] 1023.9.1 Signage requirements.** *Stairway* identification signs shall comply with all of the following requirements:

1. The signs shall be a minimum size of 18 inches (457 mm) by 12 inches (305 mm).
2. The letters designating the identification of the *interior exit stairway* and *ramp* shall be not less than 1-1/2 inches (38 mm) in height.
3. The number designating the floor level shall be not less than 5 inches (127 mm) in height and located in the center of the sign.
4. Other lettering and numbers shall be not less than 1 inch (25 mm) in height.
5. Characters and their background shall have a nonglare finish. Characters shall contrast with their background, with either light characters on a dark background or dark characters on a light background.
6. Where signs required by Section 1023.9 are installed in the *interior exit stairways* and *ramps* of buildings subject to Section 1025, the signs shall be made of the same materials as required by Section 1025.4.

**[BE] 1023.10 Elevator lobby identification signs.** At landings in *interior exit stairways* where two or more doors lead to the floor level, any door with direct access to an enclosed elevator lobby shall be identified by signage located on the door or directly adjacent to the door stating "Elevator Lobby." Signage shall be in accordance with Section 1023.9.1, Items 4, 5 and 6.

**[BE] 1023.11 Tactile floor-level signs.** Where floor-level signs are provided in *interior exit stairways* and *ramps*, a floor-level sign identifying in the floor level in visual characters, raised characters and braille complying with ICC A117.1 shall be located at each floor-level landing adjacent to the door leading from the *interior exit stairway* and *ramp* into the *corridor*.

**[S][BE] 1023.12 ~~((Smokeproof enclosures))~~ Pressurized stairways.** Where required by Section 403.5.4, 405.7.2, ~~((or))~~ 412.2.2.1 or 510.2 of the *International Building Code*, *interior exit stairways* and *ramps* shall be ~~((smokeproof enclosures))~~ pressurized in accordance with Section 909.20.5 or 909.20.6.

**[S][BE] 1023.12.1 Termination and extension.** A ~~((smokeproof enclosure))~~ pressurized stairway shall terminate at an *exit discharge* or a *public way*. The ~~((smokeproof enclosure))~~ pressurized stairway shall be permitted to be extended by an *exit passageway* in accordance with Section 1023.3. ~~((The exit passageway shall be without openings other than the fire door assembly required by Section 1023.3.1 and those necessary for egress from the exit passageway.))~~ The *exit passageway* shall be separated from the remainder of the building by 2-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both. The exit passageway shall be protected and pressurized in the same manner as the pressurized stairway.

~~((Exceptions:~~

- ~~1. Openings in the exit passageway serving a smokeproof enclosure are permitted where the exit passageway is protected and pressurized in the same manner as the smokeproof enclosure, and openings are protected as required for access from other floors.~~
- ~~2. The fire barrier separating the smokeproof enclosure from the exit passageway is not required, provided that the exit passageway is protected and pressurized in the same manner as the smokeproof enclosure.~~

~~3-)) **Exception:** A ((*smokeproof enclosure*)) pressurized stairway shall be permitted to egress through areas on the level of exit discharge or vestibules as permitted by Section 1028.~~

~~[S][BE] ((**1023.12.2 Enclosure access.** Access to the stairway or ramp within a smokeproof enclosure shall be by way of a vestibule or an open exterior balcony.~~

~~**Exception:** Access is not required by way of a vestibule or exterior balcony for stairways and ramps using the pressurization alternative complying with Section 909.20.5 of the *International Building Code*.)~~

**[BE] 1023.13 Standpipes.** Standpipes and standpipe hose connections shall be provided where required by Sections 905.3 and 905.4.

**[S] 1023.14 Equipment in interior exit stairways.** Equipment is prohibited in interior exit stairways except for equipment necessary for independent pressurization, lighting of the interior exit stairway, sprinkler piping, standpipes, electrical equipment for fire department communication and sprinkler monitoring, and unit heaters required to protect fire protection equipment from freezing.

## SECTION 1024 EXIT PASSAGEWAYS

**[BE] 1024.1 General.** Exit passageways serving as an exit component in a means of egress system shall comply with the requirements of this section. An exit passageway shall not be used for any purpose other than as a means of egress and a circulation path.

**[BE] 1024.2 Width and capacity.** The required capacity of exit passageways shall be determined as specified in Section 1005.1 but the minimum width shall be not less than 44 inches (1118 mm), except that exit passageways serving an occupant load of less than 50 shall be not less than 36 inches (914 mm) in width. The minimum width or required capacity of exit passageways shall be unobstructed.

**Exception:** Encroachments complying with Section 1005.7.

**[BE] 1024.3 Construction.** Exit passageway enclosures shall have walls, floors and ceilings of not less than a 1-hour fire-resistance rating, and not less than that required for any connecting interior exit stairway or ramp. Exit passageways shall be constructed as fire barriers in accordance with Section 707 of the *International Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *International Building Code*, or both.

**[BE] 1024.4 Termination.** Exit passageways on the level of exit discharge shall terminate at an exit discharge. Exit passageways on other levels shall terminate at an exit.

**[S][BE] 1024.5 Openings.** Exit passageway opening protectives shall be in accordance with the requirements of Section 716 of the *International Building Code*.

~~((Except as permitted in Section 402.8.7 of the *International Building Code*, openings in exit passageways other than unprotected exterior openings shall be limited to those necessary for exit access to the exit passageway from normally occupied spaces and for egress from the exit passageway-))~~

The following openings are permitted in exit passageways:

1. Doors from rooms and spaces in accordance with Section 402.8.7 of the Seattle Building Code;
2. Unprotected exterior openings;
3. Doors necessary for exit access from normally occupied spaces;
4. Doors necessary for egress from the exit passageway;
5. Doors from interior exit stairways.

Where an interior exit stairway or ramp is extended to an exit discharge or a public way by an exit passageway, the exit passageway shall comply with Section 1023.3.1.

Elevators shall not open into an exit passageway.

**[S][BE] 1024.6 Penetrations.** Penetrations into or through an exit passageway are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization.

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2. *Fire protection systems.*
3. *Security systems.*
4. *Two-way communication systems.*
5. *Electrical raceway for fire department communication.*
6. *Electrical raceway serving the exit passageway and terminating at a steel box not exceeding 16 square inches (0.010 m<sup>2</sup>).*

Such penetrations shall be protected in accordance with Section 714 of the *International Building Code*. There shall not be penetrations or communicating openings, whether protected or not, between adjacent *exit passageways*.

### Exceptions:

1. Membrane penetrations shall be permitted on the outside of the *exit passageway*. Such penetrations shall be protected in accordance with Section 714.4.2 of the *International Building Code*.
2. Unfired unit heaters allowed by Section 1023.13 to be installed in interior exit stairways are permitted to penetrate one membrane. The conduit serving the heater is permitted to penetrate both membranes.

**[BE] 1024.7 Ventilation.** Equipment and ductwork for *exit passageway* ventilation as permitted by Section 1024.6 shall comply with one of the following:

1. The equipment and ductwork shall be located exterior to the building and shall be directly connected to the *exit passageway* by ductwork enclosed in construction as required for shafts.
2. Where the equipment and ductwork is located within the *exit passageway*, the intake air shall be taken directly from the outdoors and the exhaust air shall be discharged directly to the outdoors, or the air shall be conveyed through ducts enclosed in construction as required for shafts.
3. Where located within the building, the equipment and ductwork shall be separated from the remainder of the building, including other mechanical equipment, with construction as required for shafts.

In each case, openings into the *fire-resistance-rated* construction shall be limited to those needed for maintenance and operation and shall be protected by opening protectives in accordance with Section 716 of the *International Building Code* for shaft enclosures.

*Exit passageway* ventilation systems shall be independent of other building ventilation systems.

**[BE] 1024.8 Exit passageway exterior walls.** *Exterior walls* of the *exit passageway* shall comply with Section 705. Where nonrated walls or unprotected openings enclose the exterior of the *exit passageway* and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the building *exterior walls* within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a *fire-resistance rating* of not less than 1 hour. Openings within such *exterior walls* shall be protected by opening protectives having a *fire protection rating* of not less than 3/4 hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the floor of the *exit passageway* or to the roof line, whichever is lower.

**[BE] 1024.9 Standpipes.** Standpipes and standpipe hose connections shall be provided where required by Sections 905.3 and 905.4.

## SECTION 1025 LUMINOUS EGRESS PATH MARKINGS

**[BE] 1025.1 General.** *Approved* luminous egress path markings delineating the exit path shall be provided in high-rise buildings of Group A, B, E, I-1, M or R-1 occupancies in accordance with this section.

**Exception:** Luminous egress path markings shall not be required on the *level of exit discharge* in lobbies that serve as part of the exit path in accordance with Section 1028.2, Exception 1.

**[BE] 1025.2 Markings within exit components.** Egress path markings shall be provided in *interior exit stairways*, *interior exit ramps* and *exit passageways*, in accordance with Sections 1025.2.1 through 1025.2.6.3.

**[BE] 1025.2.1 Steps.** A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Outlining stripes shall have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 2 inches (51 mm). The leading edge of the stripe shall be placed not more than 1/2 inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch (12.7 mm) down the vertical face of the step.

**Exception:** The minimum width of 1 inch (25 mm) shall not apply to outlining stripes *listed* in accordance with UL 1994.

**[BE] 1025.2.2 Landings.** The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.

**[BE] 1025.2.3 Handrails.** *Handrails* and handrail extensions shall be marked with a solid and continuous stripe having a minimum width of 1 inch (25 mm). The stripe shall be placed on the top surface of the *handrail* for the entire length of the *handrail*, including extensions and newel post caps. Where *handrails* or handrail extensions bend or turn corners, the stripe shall not have a gap of more than 4 inches (102 mm).

**Exception:** The minimum width of 1 inch (25 mm) shall not apply to outlining stripes *listed* in accordance with UL 1994.

**[BE] 1025.2.4 Perimeter demarcation lines.** *Stair* landings and other floor areas within *interior exit stairways*, *interior exit ramps* and *exit passageways*, with the exception of the sides of steps, shall be provided with solid and continuous demarcation lines on the floor or on the walls or a combination of both. The stripes shall be 1 to 2 inches (25 mm to 51 mm) wide with interruptions not exceeding 4 inches (102 mm).

**Exception:** The minimum width of 1 inch (25 mm) shall not apply to outlining stripes *listed* in accordance with UL 1994.

**[BE] 1025.2.4.1 Floor-mounted demarcation lines.** Perimeter demarcation lines shall be placed within 4 inches (102 mm) of the wall and shall extend to within 2 inches (51 mm) of the markings on the leading edge of landings. The demarcation lines shall continue across the floor in front of all doors.

**Exception:** Demarcation lines shall not extend in front of *exit discharge* doors that lead out of an *exit* and through which occupants must travel to complete the exit path.

**[BE] 1025.2.4.2 Wall-mounted demarcation lines.** Perimeter demarcation lines shall be placed on the wall with the bottom edge of the stripe not more than 4 inches (102 mm) above the finished floor. At the top or bottom of the *stairs*, demarcation lines shall drop vertically to the floor within 2 inches (51 mm) of the step or landing edge. Demarcation lines on walls shall transition vertically to the floor and then extend across the floor where a line on the floor is the only practical method of outlining the path. Where the wall line is broken by a door, demarcation lines on walls shall continue across the face of the door or transition to the floor and extend across the floor in front of such door.

**Exception:** Demarcation lines shall not extend in front of *exit discharge* doors that lead out of an *exit* and through which occupants must travel to complete the exit path.

**[BE] 1025.2.4.3 Transition.** Where a wall-mounted demarcation line transitions to a floor-mounted demarcation line, or vice-versa, the wall-mounted demarcation line shall drop vertically to the floor to meet a complimentary extension of the floor-mounted demarcation line, thus forming a continuous marking.

**[BE] 1025.2.5 Obstacles.** Obstacles at or below 6 feet 6 inches (1981 mm) in height and projecting more than 4 inches (102 mm) into the egress path shall be outlined with markings not less than 1 inch (25 mm) in width comprised of a pattern of alternating equal bands, of luminous material and black, with the alternating bands not more than 2 inches (51 mm) thick and angled at 45 degrees (0.79 rad). Obstacles shall include, but are not limited to, standpipes, hose cabinets, wall projections, and restricted height areas. However, such markings shall not conceal any required information or indicators including but not limited to instructions to occupants for the use of standpipes.

**Exception:** The minimum width of 1 inch (25 mm) shall not apply to markings *listed* in accordance with UL 1994.

**[S][BE] 1025.2.6 Doors within the exit path.** Doors through which occupants must pass in order to complete the exit path shall be provided with markings complying with Sections 1025.2.6.1 through 1025.2.6.3.

**Exception:** Main exterior exit doors or gates that are obviously and clearly identifiable as exits need not be provided with markings where approved by the building official.

**[BE] 1025.2.6.1 Emergency exit symbol.** The doors shall be identified by a low-location luminous emergency exit symbol complying with NFPA 170. The exit symbol shall be not less than 4 inches (102 mm) in height and shall be mounted on the door, centered horizontally, with the top of the symbol not higher than 18 inches (457 mm) above the finished floor.

**[BE] 1025.2.6.2 Door hardware markings.** Door hardware shall be marked with not less than 16 square inches (10323 mm<sup>2</sup>) of luminous material. This marking shall be located behind, immediately adjacent to, or on the door handle or escutcheon. Where a panic bar is installed, such material shall be not less than 1 inch (25 mm) wide for the entire length of the actuating bar or touchpad.

**[BE] 1025.2.6.3 Door frame markings.** The top and sides of the door frame shall be marked with a solid and continuous 1-inch- to 2-inch-wide (25 mm to 51 mm) stripe. Where the door molding does not provide sufficient flat surface on which to locate the stripe, the stripe shall be permitted to be located on the wall surrounding the frame.

**[BE] 1025.3 Uniformity.** Placement and dimensions of markings shall be consistent and uniform throughout the same enclosure.

**Exception:** The adjoining compartment shall not be required to have a *stairway* or door leading directly outside, provided that the refuge area into which a *horizontal exit* leads has *stairways* or doors leading directly outside and are so arranged that egress shall not require the occupants to return through the compartment from which egress originates.

**[BE] 1026.5 Standpipes.** Standpipes and standpipe hose connections shall be provided where required by Sections 905.3 and 905.4.

## SECTION 1027 EXTERIOR EXIT STAIRWAYS AND RAMPS

**[BE] 1027.1 General.** *Exterior exit stairways* and *ramps* serving as an exit component in a *means of egress* system shall comply with the requirements of this section.

**[BE] 1027.2 Use in a means of egress.** *Exterior exit stairways* shall not be used as an element of a required *means of egress* for Group I-2 occupancies. For occupancies in other than Group I-2, *exterior exit stairways* and *ramps* shall be permitted as an element of a required *means of egress* for buildings not exceeding six stories above *grade plane* or that are not high-rise buildings.

**[S][BE] 1027.3 Open side.** *Exterior exit stairways* and *ramps* serving as an element of a required *means of egress* shall be at least 50 percent open on not less than one side, ~~((except for required structural columns, beams, handrails and guards.))~~ An open side shall have not less than ~~((35 square feet (3.3 m<sup>2</sup>)))~~ 28 square feet (2.6 m<sup>2</sup>) of aggregate open area adjacent to each floor level, ~~((and the level of each intermediate landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.))~~ The open area shall be distributed to prevent accumulation of smoke or toxic gases.

**[BE] 1027.4 Side yards.** The open areas adjoining *exterior exit stairways* or *ramps* shall be either *yards*, *courts* or *public ways*; the remaining sides are permitted to be enclosed by the *exterior walls* of the building.

**[BE] 1027.5 Location.** *Exterior exit stairways* and *ramps* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or ramps, including landings, to:

1. Adjacent lot lines.
2. Other portions of the building.
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 of the *International Building Code* based on *fire separation distance*.

For the purposes of this section, other portions of the building shall be treated as separate buildings.

**Exception:** *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall have a *fire separation distance* of not less than 5 feet (1524 mm).

**[S][BE] 1027.6 Exterior exit stairway and ramp protection.** *Exterior exit stairways* and *ramps* shall be separated from the interior of the building as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an *exterior exit stairway* or *ramp* and landings is exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the *exterior wall* shall be rated in accordance with Section 1023.7.

### Exceptions:

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are not more than two stories above *grade plane* where a *level of exit discharge* serving such occupancies is the first story above *grade plane*.
2. Separation from the interior of the building is not required where the *exterior exit stairway* or *ramp* is served by an *exterior exit ramp* or balcony that connects two remote *exterior exit stairways* or other *approved exits*, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the *open-ended corridor* of the building is not required for *exterior exit stairways* or *ramps*, provided that Items 3.1 through 3.5 are met:
  - 3.1. The building, including *open-ended corridors*, and *stairways* and *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
  - 3.2. The *open-ended corridors* comply with Section 1020.
  - 3.3. The *open-ended corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1027.

- 3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Sections 1023.7 and 1027.7.
- 3.5. At any location in an *open-ended corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m<sup>2</sup>) or an exterior *stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.
4. In Group R-3 occupancies not more than four stories in height, *exterior exit stairways* and *ramps* serving individual *dwelling units* are not required to be separated from the interior of the building where the *exterior exit stairway* or *ramp* discharges directly to grade.

**[S] 1027.7 Exterior exit stairway and ramp exterior walls.** Where nonrated walls or unprotected openings enclose the exterior of the stairway and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the building exterior walls within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls shall be protected by opening protectives having a fire protection rating of not less than 3/4 hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the stairway or to the roof line, whichever is lower.

## SECTION 1028 EXIT DISCHARGE

**[S][BE] 1028.1 General.** The *exit discharge* shall comply with Sections 1028 and 1029 and the applicable requirements of Sections 1003 through 1015.

**[BE] 1028.2 Exit discharge.** *Exits* shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building except into an exit or as otherwise approved by the building official. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

### Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including atriums, on the *level of discharge* provided that all of the following conditions are met:
  - 1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior exit door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.
  - 1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.
  - 1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall either be equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.
  - 1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the exit discharge door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.
2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
  - 2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp* enclosure.
  - 2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the ~~((length))~~ width is not greater than 30 feet (9144 mm).
  - 2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708 of the *International Building Code*.

**Exception:** The maximum transmitted temperature rise is not required.

- 2.4. The area is used only for *means of egress* and *exits* directly to the outside.
3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

**[S] 1028.2.1 Remoteness of egress paths at building exterior.** The paths of egress travel from separate exits shall be separated by at least 10 feet at the exterior of the building. The separation shall be maintained for at least 10 feet, as measured from the face of the exterior wall containing the exits, before the paths of egress travel are permitted to converge. The paths of egress travel, before and after convergence, shall provide unobstructed access to a public way. Where three or more exits are required, at least two paths shall be arranged in accordance with this provision.

**[BE] 1028.3 Exit discharge width or capacity.** The minimum width or required capacity of the *exit discharge* shall be not less than the minimum width or required capacity of the *exits* being served.

**[BE] 1028.4 Exit discharge components.** *Exit discharge* components shall be sufficiently open to the exterior so as to minimize the accumulation of smoke and toxic gases.

**[S][BE] 1028.5 Access to a public way.** The *exit discharge* shall provide a direct and unobstructed access to a *public way*. Converging paths of egress travel located in the *exit discharge* are permitted under the conditions of Section 1028.2.1.

**Exception:** Where access to a *public way* cannot be provided, a safe dispersal area shall be provided where all of the following are met:

1. The area shall be of a size to accommodate *not less than* 5 square feet (0.46 m<sup>2</sup>) for each person.
2. The area shall be located on the same lot not less than 50 feet (15 240 mm) away from the building requiring egress.
3. The area shall be permanently maintained and identified as a safe dispersal area.
4. The area shall be provided with a safe and unobstructed path of travel from the building.

## SECTION 1029 EGRESS COURTS

**[BE] 1029.1 General.** *Egress courts* serving as an *exit discharge component* in the *means of egress* system shall comply with the requirements in this section.

**[BE] 1029.2 Width or capacity.** The required capacity of *egress courts* shall be determined as specified in Section 1005.1, but the minimum width shall be not less than 44 inches (1118 mm), except as specified herein. *Egress courts* serving Group R-3 and U occupancies shall be not less than 36 inches (914 mm) in width. The required capacity and width of *egress courts* shall be unobstructed to a height of 7 feet (2134 mm).

The width of the *egress court* shall be not less than the required capacity.

**Exception:** Encroachments complying with Section 1005.7.

**[S][BE] 1029.3 Construction and openings.** Where an *egress court* serving a building or portion thereof is less than 10 feet (3048 mm) in width, the *egress court* walls shall have not less than 1-hour *fire-resistance-rated* construction for a distance of 10 feet (3048 mm) above the floor of the *egress court*. Openings within such walls shall be protected by opening protectives having a *fire protection rating* of not less than 3/4 hour.

**Exceptions:**

1. *Egress courts* serving an *occupant load* of less than 10.
2. *Egress courts* serving Group R-3.
3. In buildings other than those that have a single means of egress under subsection 1006.3.3(7), opening protection need not be provided where it is possible to exit in two directions from the court.

## SECTION 1030 ASSEMBLY

**[BE] 1030.1 General.** A room or space used for assembly purposes that contains seats, tables, displays, equipment or other material shall comply with this section.

**[BE] 1030.1.1 Bleachers.** *Bleachers*, *grandstands* and *folding and telescopic seating*, that are not building elements, shall comply with ICC 300.

**[BE] 1030.1.1.1 Spaces under grandstands and bleachers.** Spaces under *grandstands* or *bleachers* shall be separated by *fire barriers* complying with Section 707 of the *International Building Code* and *horizontal assemblies* complying with Section 711 of the *International Building Code* with not less than 1-hour *fire-resistance-rated* construction.



[BE] **1030.16.4 Rails.** Where mid-aisle *handrails* are provided in stepped *aisles*, there shall be an additional rail located approximately 12 inches (305 mm) below the *handrail*. The rail shall be adequate in strength and attachment in accordance with Section 1607.9.1.2 of the *International Building Code*.

[BE] **1030.17 Assembly guards.** *Guards* adjacent to seating in a building, room or space used for assembly purposes shall be provided where required by Section 1015 and shall be constructed in accordance with Section 1015 except where provided in accordance with Sections 1030.17.1 through 1030.17.4. At *bleachers*, *grandstands* and *folding and telescopic seating*, *guards* must be provided where required by ICC 300 and Section 1030.17.1.

[BE] **1030.17.1 Perimeter guards.** Perimeter *guards* shall be provided where the footboards or walking surface of seating facilities are more than 30 inches (762 mm) above the floor or grade below. Where the seatboards are adjacent to the perimeter, *guard* height shall be 42 inches (1067 mm) high minimum, measured from the seatboard. Where the seats are self-rising, *guard* height shall be 42 inches (1067 mm) high minimum, measured from the floor surface. Where there is an *aisle* between the seating and the perimeter, the *guard* height shall be measured in accordance with Section 1015.3.

**Exceptions:**

1. *Guards* that impact sightlines shall be permitted to comply with Section 1030.17.3.
2. *Bleachers*, *grandstands* and *folding and telescopic seating* shall not be required to have perimeter *guards* where the seating is located adjacent to a wall and the space between the wall and the seating is less than 4 inches (102 mm).

[BE] **1030.17.2 Cross aisles.** Cross *aisles* located more than 30 inches (762 mm) above the floor or grade below shall have *guards* in accordance with Section 1015.

Where an elevation change of 30 inches (762 mm) or less occurs between a cross *aisle* and the adjacent floor or grade below, *guards* not less than 26 inches (660 mm) above the *aisle* floor shall be provided.

**Exception:** Where the backs of seats on the front of the cross *aisle* project 24 inches (610 mm) or more above the adjacent floor of the *aisle*, a *guard* need not be provided.

[BE] **1030.17.3 Sightline-constrained guard heights.** Unless subject to the requirements of Section 1030.17.4, a fascia or railing system in accordance with the *guard* requirements of Section 1015 and having a minimum height of 26 inches (660 mm) shall be provided where the floor or footboard elevation is more than 30 inches (762 mm) above the floor or grade below and the fascia or railing would otherwise interfere with the sightlines of immediately adjacent seating.

[BE] **1030.17.4 Guards at the end of aisles.** A fascia or railing system complying with the *guard* requirements of Section 1015 shall be provided for the full width of the *aisle* where the foot of the *aisle* is more than 30 inches (762 mm) above the floor or grade below. The fascia or railing shall be not less than 36 inches (914 mm) high and shall provide not less than 42 inches (1067 mm) measured diagonally between the top of the rail and the *nosing* of the nearest tread.

## SECTION 1031 EMERGENCY ESCAPE AND RESCUE

[BE] **1031.1 General.** Emergency escape and rescue openings shall comply with the requirements of this section.

[S][BE] **1031.2 Where required.** In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Buildings designed with a single exit according to Section 1006.3.4, condition 7.
- ~~(2)~~ 3. Group R-3 and R-4 occupancies.
4. *Dwelling units* with a single exit per Section 1006.3.4, condition 5.

[S] **1031.2.1 Where required.** (~~Basements~~) Where required by Section 1031.2, *basements* and sleeping rooms below the fourth story above grade plane shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way*.

**Exceptions:**

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that opens to a *public way*.

## MEANS OF EGRESS

3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m<sup>2</sup>) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
  - 5.1. One *means of egress* and one *emergency escape and rescue opening*.
  - 5.2. Two *means of egress*.

[S][BE] ~~(1031.2.1)~~ **1031.2.2 Operational constraints and opening control devices.** Emergency escape and rescue openings shall be operational from inside the room without the use of keys or tools. Window-opening control devices complying with ASTM F2090 shall be permitted for use on windows serving as a required emergency escape and rescue opening.

[BE] **1031.3 Emergency escape and rescue openings.** *Emergency escape and rescue openings* shall comply with Sections 1031.3.1 through 1031.3.3.

[BE] **1031.3.1 Minimum size.** *Emergency escape and rescue openings* shall have a minimum net clear opening of 5.7 square feet (0.53 m<sup>2</sup>).

**Exception:** The minimum net clear opening for grade-floor *emergency escape and rescue openings* shall be 5 square feet (0.46 m<sup>2</sup>).

[BE] **1031.3.2 Minimum dimensions.** The minimum net clear opening height dimension shall be 24 inches (610 mm). The minimum net clear opening width dimension shall be 20 inches (508 mm). The net clear opening dimensions shall be the result of normal operation of the opening.

[BE] **1031.3.3 Maximum height from floor.** *Emergency escape and rescue openings* shall have the bottom of the clear opening not greater than 44 inches (1118 mm) measured from the floor.

[BE] **1031.4 Emergency escape and rescue doors.** Where a door is provided as the required *emergency escape and rescue opening*, it shall be a swinging door or a sliding door.

[BE] **1031.5 Area wells.** An *emergency escape and rescue opening* with the bottom of the clear opening below the adjacent grade shall be provided with an area well in accordance with Sections 1031.5.1 through 1031.5.3.

[BE] **1031.5.1 Minimum size.** The minimum horizontal area of the area well shall be 9 square feet (0.84 m<sup>2</sup>), with a horizontal projection and width of not less than 36 inches (914 mm). The area well shall allow the *emergency escape and rescue opening* to be fully opened.

**Exception:** The ladder or steps required by Section 1031.5.2 shall be permitted to encroach not more than 6 inches (152 mm) into the required dimensions of the area well.

[BE] **1031.5.2 Ladders or steps.** Area wells with a vertical depth of more than 44 inches (1118 mm) shall be equipped with an *approved* permanently affixed ladder or steps. The ladder or steps shall not be obstructed by the *emergency escape and rescue opening* when the window or door is in the open position. Ladders or steps required by this section shall not be required to comply with Section 1011.

[BE] **1031.5.2.1 Ladders.** Ladders or rungs shall have an inside width of at least 12 inches (305 mm), shall project at least 3 inches (76 mm) from the wall and shall be spaced not more than 18 inches (457 mm) on center (o.c.) vertically for the full height of the area well.

[BE] **1031.5.2.2 Steps.** Steps shall have an inside width of not less than 12 inches (305 mm), shall have treads greater than 5 inches (127 mm) in depth and a riser height not greater than 18 inches (457 mm) for the full height of the area well.

[BE] **1031.5.3 Drainage.** Area wells shall be designed for proper drainage by connecting to the building's foundation drainage system required by Section 1805 of the *International Building Code*.

**Exception:** A drainage system for area wells is not required where the foundation is on well-drained soil or sand-gravel mixture soils in accordance with the United Soil Classification System, Group I Soils, in accordance with Section 1803.5.1 of the *International Building Code*.

[BE] **1031.6 Bars, grilles, covers and screens.** Where bars, grilles, covers, screens or similar devices are permitted to be placed over *emergency escape and rescue openings*, or area wells that serve such openings, the minimum net clear opening size shall comply with Sections 1031.3 and 1031.5. Such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the escape and rescue opening.

**[W] 1031.7 Drainage.** Window wells shall be designed for proper drainage by connecting to the building's foundation drainage system required by Section 1805.4.2 of the *International Building Code* or by an *approved* alternative method.

## SECTION 1032 MAINTENANCE OF THE MEANS OF EGRESS

**1032.1 General.** The *means of egress* for buildings or portions thereof shall be maintained in accordance with this section.

**1032.2 Reliability.** Required *exit accesses*, *exits* and *exit discharges* shall be continuously maintained free from obstructions or impediments to full instant use in the case of fire or other emergency where the building area served by the *means of egress* is occupied. An *exit* or *exit passageway* shall not be used for any purpose that interferes with a *means of egress*.

**1032.2.1 Security devices and egress locks.** Security devices affecting *means of egress* shall be subject to approval of the *fire code official*. Security devices and locking arrangements in the *means of egress* that restrict, control, or delay egress shall be installed and maintained as required by this chapter.

**1032.2.1.1 Fire escapes.** Security enclosures, fences or screening for fire escape stairways shall be *approved* by the *fire code official* and shall be constructed such that they do not impede egress to the *public way*. Means shall be provided for emergency personnel to access the fire escape stair from the exterior of the enclosure.

**[BE] 1032.2.2 Locking arrangements in educational occupancies.** In Group E occupancies, Group B educational occupancies and Group I-4 occupancies, egress doors with locking arrangements designed to keep intruders from entering the room shall comply with Section 1010.2.8.

**1032.3 Obstructions.** A *means of egress* shall be free from obstructions that would prevent its use, including the accumulation of snow and ice.

**1032.3.1 Group I-2.** In Group I-2, the required clear width for *aisles*, *corridors* and *ramps* that are part of the required *means of egress* shall comply with Section 407.4.3 of the *International Building Code* and Section 1020.3. The facility shall have a plan to maintain the required clear width during emergency situations.

**Exception:** In areas required for bed movement, equipment shall be permitted in the required width where all of the following provisions are met:

1. The equipment is low hazard and wheeled.
2. The equipment does not reduce the effective clear width for the *means of egress* to less than 5 feet (1525 mm).
3. The equipment is limited to:
  - 3.1. Equipment and carts in use.
  - 3.2. Medical emergency equipment.
  - 3.3. Infection control carts.
  - 3.4. Patient lift and transportation equipment.
4. Medical emergency equipment and patient lift and transportation equipment, when not in use, are required to be located on one side of the corridor.
5. The equipment is limited in number to not more than one per patient sleeping room or patient care room within each *smoke compartment*.

**[BE] 1032.4 Exit signs.** Exit signs shall be installed and maintained in accordance with the building code that was in effect at the time of construction and the applicable provisions in Section 1104. Decorations, furnishings, equipment or adjacent signage that impairs the visibility of exit signs, creates confusion or prevents identification of the *exit* shall not be allowed.

**1032.5 Nonexit identification.** Where a door is adjacent to, constructed similar to and can be confused with a *means of egress* door, that door shall be identified with an *approved* sign that identifies the room name or use of the room.

**1032.6 Finishes, furnishings and decorations.** *Means of egress* doors shall be maintained in such a manner as to be distinguishable from the adjacent construction and finishes such that the doors are easily recognizable as doors. Furnishings, decorations or other objects shall not be placed so as to obstruct *exits*, access thereto, egress therefrom, or visibility thereof. Hangings and draperies shall not be placed over *exit* doors or otherwise be located to conceal or obstruct an *exit*. Mirrors shall not be placed on *exit* doors. Mirrors shall not be placed in or adjacent to any *exit* in such a manner as to confuse the direction of egress.

**1032.7 Emergency escape and rescue openings.** Required *emergency escape and rescue openings* shall be maintained in accordance with the code in effect at the time of construction, and both of the following:

1. Required *emergency escape and rescue openings* shall be operational from the inside of the room without the use of keys or tools.

## CHAPTER 11

# ~~((CONSTRUCTION))~~ REQUIREMENTS FOR EXISTING BUILDINGS

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**User note:**

**About this chapter:** Chapter 11 applies to existing buildings constructed prior to the adoption of the code and is intended to ensure a minimum degree of fire and life safety to persons occupying existing buildings by providing for alterations to such buildings that do not comply with the minimum requirements of the International Building Code®. The provisions address general fire safety features such as requirements for fire alarm systems in some existing buildings and general means of egress, and include a section dedicated to existing Group I-2 occupancies.

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### SECTION 1101 GENERAL

[S] **1101.1 Scope.** The provisions of this chapter (~~shall~~) apply to existing buildings constructed prior to the adoption of this code.

[S] **1101.2 Intent.** The intent of this chapter is to provide a minimum degree of fire and life safety to persons occupying existing buildings by providing minimum (~~construction~~) requirements where such existing buildings do not comply with the minimum requirements of the *International Building Code*.

[S] **1101.3 Permits.** Permits (~~shall be~~) are required as set forth in Sections 105.5 and 105.6 and the *International Building Code*.

**1101.4 Owner notification.** When a building is found to be in noncompliance with this chapter, the *fire code official* shall duly notify the *owner* of the building. Upon receipt of such notice, the *owner* shall, subject to the following time limits, take necessary actions to comply with the provisions of this chapter.

**1101.4.1 Construction documents.** *Construction documents* necessary to comply with this chapter shall be completed and submitted within a time schedule *approved* by the *fire code official*.

**1101.4.2 Completion of work.** Work necessary to comply with this chapter shall be completed within a time schedule *approved* by the *fire code official*.

**1101.4.3 Extension of time.** The *fire code official* is authorized to grant necessary extensions of time where it can be shown that the specified time periods are not physically practical or pose an undue hardship. The granting of an extension of time for compliance shall be based on the showing of good cause and subject to the filing of an acceptable systematic plan of correction with the *fire code official*.

### SECTION 1102 DEFINITIONS

**1102.1 Definitions.** The following terms are defined in Chapter 2:

**DUTCH DOOR.**

**EXISTING.**

### SECTION 1103 FIRE SAFETY REQUIREMENTS FOR EXISTING BUILDINGS

**1103.1 Required construction.** Existing buildings shall comply with not less than the minimum provisions specified in Table 1103.1 and as further enumerated in Sections 1103.2 through 1103.10.

The provisions of this chapter shall not be construed to allow the elimination of *fire protection systems* or a reduction in the level of fire safety provided in buildings constructed in accordance with previously adopted codes.

**Exceptions:**

1. Where a change in *fire-resistance rating* has been *approved* in accordance with Section 501.2 or 802.6 of the *International Existing Building Code*.
2. Group U occupancies.

**CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS**

**1103.1.1 Historic buildings.** Facilities designated as historic buildings shall develop a fire protection plan in accordance with NFPA 914. The fire protection plans shall comply with the maintenance and availability provisions in Sections 404.3 and 404.4.

**TABLE 1103.1  
OCCUPANCY AND USE REQUIREMENTS<sup>a</sup>**

SECTION	USE				OCCUPANCY CLASSIFICATION																			
	High-rise	Atrium or covered mall	Under-ground building	Tire storage	A	B	E	F	H-1	H-2	H-3	H-4	H-5	I-1	I-2	I-3	I-4	M	R-1	R-2	R-3	R-4	S	
1103.2	R	R	R	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	—	—	R
1103.3	R	—	R	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	—	—	R
1103.4.1	R	—	R	—	—	—	—	—	—	—	—	—	—	—	R	R	—	—	—	—	—	—	—	—
1103.4.2	R	—	R	—	R	R	R	R	R	R	R	R	R	R	—	—	R	R	R	R	—	—	R	—
1103.4.3	R	—	R	—	R	R	R	R	R	R	R	R	R	R	—	—	R	R	R	R	—	—	R	—
1103.4.4	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1103.4.5	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—
1103.4.6	—	—	—	—	R	—	R	R	R	R	R	R	R	R	R	R	R	—	R	R	R	R	R	R
1103.4.7	—	—	—	—	R	—	R	R	R	R	R	R	R	R	R	R	R	—	R	R	R	R	R	R
1103.4.8	R	—	R	—	R	R	R	R	R	R	R	R	R	R	—	—	R	R	R	R	R	R	R	R
1103.4.9	R	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—
1103.4.10	—	—	—	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
1103.5.1	—	—	—	—	R <sup>c</sup>	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1103.5.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—
1103.5.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R <sup>b</sup>	—	—	—	—	—	—	—	—	—
1103.5.5	—	—	—	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
1103.6.1	R	—	R	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	—	—	R	—
1103.6.2	R	—	R	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	—	—	R	—
1103.7.1	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1103.7.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—
1103.7.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—
1103.7.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—
1103.7.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—
1103.7.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—
1103.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	R	R	R	R	—
1103.9	R	—	—	—	—	—	—	—	—	—	—	—	—	R	R	—	R	—	R	R	R	R	R	—
1103.10	—	—	—	—	—	—	—	—	—	—	—	—	—	R	R	—	—	—	—	—	—	—	—	—
1104	R	R	R	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
1105	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—
1106	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

R = The building is required to comply.

- a. Existing buildings shall comply with the sections identified as “Required” (R) based on occupancy classification or use, or both, whichever is applicable.
- b. Only applies to Group I-2, Condition 2 occupancies as established by the adopting ordinance or legislation of the jurisdiction.
- c. Only applies to Group A-2 occupancies where alcoholic beverages are consumed.

**[S] 1103.2 Emergency responder communication coverage in existing high-rise buildings.** (~~Existing buildings other than Group R-3, that do not have approved in building, two way emergency response communication coverage for emergency responders in the building based on existing coverage levels of the public safety communication systems, shall be equipped with such coverage according to one of the following:)) Existing high-rise buildings are required to provide emergency responder communication coverage per Section 510. Buildings constructed pursuant to a version of this code earlier than the 2015 Seattle Fire Code shall not be required to comply with the emergency responder radio coverage systems provisions of Section 510 when an existing wired communication system in accordance with Section 907.2.12.2 is installed or the building has acceptable in-building emergency responder communication enhancement system signal strength per Section 510.4.1.~~

- ~~(1. Where an existing wired communication system cannot be repaired or is being replaced, or where not approved in accordance with Section 510.1, Exception 1.~~
- 2. Within a time frame established by the adopting authority.

~~**Exception:** Where it is determined by the *fire code official* that the in-building, two-way emergency responder communication coverage system is not needed.)~~

**1103.3 Existing elevators.** In other than Group R-3, existing elevators, escalators and moving walks shall comply with the requirements of Sections 1103.3.1 and 1103.3.2.

**1103.3.1 Elevators, escalators and moving walks.** Existing elevators, escalators and moving walks in Group I-2, Condition 2 occupancies and serving ambulatory care facilities shall comply with ASME A17.3.

**1103.3.2 Elevator emergency operation.** Existing elevators with a travel distance of 25 feet (7620 mm) or more above or below the main floor or other level of a building and intended to serve the needs of emergency personnel for fire-fighting or rescue purposes shall be provided with emergency operation in accordance with ASME A17.3.

**Exceptions:**

1. Buildings without occupied floors located more than 55 feet (16 764 mm) above or 25 feet (7620 mm) below the lowest level of fire department vehicle access where protected at the elevator shaft openings with additional fire doors in accordance with Section 716 of the *International Building Code* and where all of the following conditions are met:
  - 1.1. The doors shall be provided with vision panels of *approved* fire-protection-rated glazing so located as to furnish clear vision of the approach to the elevator. Such glazing shall not exceed 100 square inches (0.065 m<sup>2</sup>) in area.
  - 1.2. The doors shall be held open but be automatic-closing by activation of a fire alarm initiating device installed in accordance with the requirements of NFPA 72 as for Phase I Emergency Recall Operation, and shall be located at each floor served by the elevator; in the associated elevator machine room, control space, or control room; and in the elevator hoistway, where sprinklers are located in those hoistways.
  - 1.3. The doors, when closed, shall have signs visible from the approach area stating: "WHEN THESE DOORS ARE CLOSED OR IN FIRE EMERGENCY, DO NOT USE ELEVATOR. USE EXIT STAIRWAYS."
2. Buildings without occupied floors located more than 55 feet (16 764 mm) above or 25 feet (7620 mm) below the lowest level of fire department vehicle access where provided with *automatic sprinkler systems* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. Freight elevators in buildings provided with both *automatic sprinkler systems* installed in accordance with Section 903.3.1.1 or 903.3.1.2 and not less than one ASME 17.3-compliant elevator serving the same floors.

Elimination of previously installed Phase I emergency recall or Phase II emergency in-car systems shall not be permitted.

**1103.4 Vertical openings.** Interior vertical openings, including but not limited to *stairways*, elevator hoistways, service and utility shafts, that connect two or more stories of a building shall be enclosed or protected as specified in Sections 1103.4.1 through 1103.4.10.

**1103.4.1 Group I-2 and I-3 occupancies.** In Group I-2 and I-3 occupancies, interior vertical openings connecting two or more stories shall be protected with 1-hour *fire-resistance-rated* construction.

**Exceptions:**

1. In Group I-2, unenclosed vertical openings not exceeding two connected stories and not concealed within the building construction shall be permitted as follows:
  - 1.1. The unenclosed vertical openings shall be separated from other unenclosed vertical openings serving other floors by a *smoke barrier*.
  - 1.2. The unenclosed vertical openings shall be separated from *corridors* by smoke partitions.
  - 1.3. The unenclosed vertical openings shall be separated from other fire or *smoke compartments* on the same floors by a *smoke barrier*.
  - 1.4. On other than the lowest level, the unenclosed vertical openings shall not serve as a required *means of egress*.
2. In Group I-2, atriums connecting three or more stories shall not require 1-hour *fire-resistance-rated* construction where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3, and all of the following conditions are met:
  - 2.1. For other than existing *approved* atriums with a smoke control system, where the atrium was constructed and is maintained in accordance with the code in effect at the time the atrium was created, the atrium shall have a smoke control system that is in compliance with Section 909.

## CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

2.2. Glass walls forming a smoke partition or a glass-block wall assembly shall be permitted where in compliance with Condition 2.2.1 or 2.2.2.

2.2.1. Glass walls forming a smoke partition shall be permitted where all of the following conditions are met:

2.2.1.1. Automatic sprinklers are provided along both sides of the separation wall and doors, or on the room side only if there is not a walkway or occupied space on the atrium side.

2.2.1.2. The sprinklers shall be not more than 12 inches (305 mm) away from the face of the glass and at intervals along the glass of not greater than 72 inches (1829 mm).

2.2.1.3. Windows in the glass wall shall be nonoperating type.

2.2.1.4. The glass wall and windows shall be installed in a gasketed frame in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates.

2.2.1.5. The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction.

2.2.2. A *fire barrier* is not required where a glass-block wall assembly complying with Section 2110 of the *International Building Code* and having a 3/4-hour *fire protection rating* is provided.

2.3. Where doors are provided in the glass wall, they shall be either self-closing or automatic-closing and shall be constructed to resist the passage of smoke.

3. In Group I-3 occupancies, exit *stairways* or *ramps* and *exit access stairways* or *ramps* constructed in accordance with Section 408 of the *International Building Code*.

**1103.4.2 Three to five stories.** In other than Group I-2 and I-3 occupancies, interior vertical openings connecting three to five stories shall be protected by either 1-hour *fire-resistance-rated* construction or an *automatic sprinkler system* shall be installed throughout the building in accordance with Section 903.3.1.1 or 903.3.1.2.

### Exceptions:

1. Vertical opening protection is not required for Group R-3 occupancies.
2. Vertical opening protection is not required for open parking garages.
3. Vertical opening protection for escalators shall be in accordance with Section 1103.4.5, 1103.4.6 or 1103.4.7.
4. *Exit access stairways* and *ramps* shall be in accordance with Section 1103.4.8.

**[W] 1103.4.3 More than five stories.** In other than Group ((~~I-2 and I-3~~)) I occupancies, interior vertical openings connecting more than five stories shall be protected by ((~~1-hour~~)) fire-resistance- and smoke-rated construction.

### Exceptions:

1. Vertical opening protection is not required for Group R-3 occupancies.
2. Vertical opening protection is not required for open parking garages.
3. Vertical opening protection for escalators shall be in accordance with Section 1103.4.5, 1103.4.6 or 1103.4.7.
4. *Exit access stairways* and *ramps* shall be in accordance with Section 1103.4.8.

**1103.4.4 Atriums and covered malls.** In other than Group I-2 and I-3 occupancies, interior vertical openings in a covered mall building or a building with an atrium shall be protected by either 1-hour *fire-resistance-rated* construction or an *automatic sprinkler system* shall be installed throughout the building in accordance with Section 903.3.1.1 or 903.3.1.2.

### Exceptions:

1. Vertical opening protection is not required for Group R-3 occupancies.
2. Vertical opening protection is not required for open parking garages.
3. *Exit access stairways* and *ramps* shall be in accordance with Section 1103.4.8.

**1103.4.5 Escalators in Group B and M occupancies.** In Group B and M occupancies, escalators creating vertical openings connecting any number of stories shall be protected by either 1-hour *fire-resistance-rated* construction or an *automatic sprinkler system* in accordance with Section 903.3.1.1 installed throughout the building, with a draft curtain and closely spaced sprinklers around the escalator opening.

**1103.4.6 Escalators connecting four or fewer stories.** In other than Group B and M occupancies, escalators creating vertical openings connecting four or fewer stories shall be protected by either 1-hour *fire-resistance-rated* construction or an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 shall be installed throughout the building, and a draft curtain with closely spaced sprinklers shall be installed around the escalator opening.

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**[S] 1103.5.3 Group I-2, Condition 2.** In addition to the requirements of Section 1103.5.2, existing buildings of Group I-2, Condition 2 occupancy shall be equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1. (~~The *automatic sprinkler system* shall be installed as established by the adopting ordinance. [DATE BY WHICH SPRINKLER SYSTEM MUST BE INSTALLED].~~)

**1103.5.4 High-rise buildings.** Where Appendix M has not been adopted, existing high-rise buildings that do not have a previously *approved* fire sprinkler system shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1 where any of the following conditions apply:

1. The high-rise building has an occupied floor located more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access.
2. The high-rise building has occupied floors located more than 75 feet (22 860 mm) and not more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, and the building does not have at least two *interior exit stairways* complying with Section 1104.10 that are separated from the building interior by fire assemblies having a *fire-resistance rating* of not less than 2 hours with opening protection in accordance with Table 716.1(2) of the *International Building Code*.
3. The high-rise building has occupied floors located more than 75 feet (22 860 mm) and not more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, and the building does not have a fire alarm system that includes smoke detection in mechanical equipment, electrical, transformer, telephone equipment and similar rooms; corridors; elevator lobbies; and at doors penetrating *interior exit stairway* enclosures.

Building *owners* shall file a compliance schedule with the *fire code official* not later than 365 days after receipt of a written notice. The compliance schedule shall not exceed 12 years for completion of the *automatic sprinkler system* retrofit.

**1103.5.5 Pyroxylin plastics.** An *automatic sprinkler system* shall be provided throughout existing buildings where cellulose nitrate film or pyroxylin plastics are manufactured, stored or handled in quantities exceeding 100 pounds (45 kg). Vaults located within buildings for the storage of raw pyroxylin shall be protected with an *approved automatic sprinkler system* capable of discharging 1.66 gallons per minute per square foot (68 L/min/m<sup>2</sup>) over the area of the vault.

**[W] 1103.5.6 Nightclub.** An *automatic sprinkler system* shall be provided throughout A-2 *nightclubs* as defined in this code. No building shall be constructed for, used for, or converted to occupancy as a *nightclub* except in accordance with this section.

**[S] 1103.5.7 Additions to Group LC or Group R-2 occupancies.** An *automatic sprinkler system* installed in accordance with Section 903.3.1.2 shall be permitted in additions to existing buildings where both of the following situations are true:

1. The addition is made to a building previously *approved* as a Group LC or Group R-2 occupancy that houses either an assisted living facility licensed under chapter 388-78A WAC or residential treatment facility licensed under chapter 246-337 WAC.
2. The addition contains spaces for 16 or fewer persons receiving care.

**1103.6 Standpipes.** Existing structures shall be equipped with standpipes installed in accordance with Section 905 where required in Sections 1103.6.1 and 1103.6.2. The *fire code official* is authorized to approve the installation of manual standpipe systems to achieve compliance with this section where the responding fire department is capable of providing the required hose flow at the highest standpipe outlet.

**1103.6.1 Existing multiple-story buildings.** Existing buildings with occupied floors located more than 50 feet (15 240 mm) above the lowest level of fire department access or more than 50 feet (15 240 mm) below the highest level of fire department access shall be equipped with standpipes.

**1103.6.2 Existing helistops and heliports.** Existing buildings with a rooftop helistop or heliport located more than 30 feet (9144 mm) above the lowest level of fire department access to the roof level on which the helistop or heliport is located shall be equipped with standpipes in accordance with Section 2007.5.

**[S] 1103.6.3 Signs for high-rise buildings.** An additional sign with letters at least 1 inch (25 mm) in size shall be provided at the fire department connections of high-rise buildings that indicate the building fire pump static (churn) discharge pressure. Where the pump is more than two stories above or below the fire department connections, the pump static/churn discharge pressure on the signage shall be adjusted to correct for the elevation difference.

**[S] 1103.7 Fire alarm systems.** An *approved* fire alarm system shall be installed in existing buildings and structures in accordance with Sections 1103.7.1 through 1103.7.6 and provide occupant notification in accordance with Section 907.5 unless other requirements are provided by other sections of this code.

**Exception:** (~~Occupancies~~) Non-residential occupancies with an existing, previously *approved* fire alarm system, and residential occupancies with a fire alarm system capable of achieving a minimum sound level in the sleeping rooms of 60 dBA or 15 dBA above ambient noise level, whichever is higher.

**1103.7.1 Group E.** A fire alarm system shall be installed in existing Group E occupancies in accordance with Section 907.2.3.



## CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

an attic, crawl space or *basement* available that could provide access for building wiring without the removal of interior finishes.

**[W] ((1103.9 Carbon monoxide detection.** Carbon monoxide detection shall be installed in existing Group I-1, I-2, I-4 and R occupancies and in classrooms in Group E occupancies where those units include any of the conditions identified in Sections 915.1.2 through 915.1.6. The carbon monoxide alarms shall be installed in the locations specified in Section 915.2 and the installation shall be in accordance with Section 915.4.

### **Exceptions:**

1. Carbon monoxide alarms are permitted to be solely battery operated where the code that was in effect at the time of construction did not require carbon monoxide detectors to be provided.
2. Carbon monoxide alarms are permitted to be solely battery operated in *dwelling units* that are not served from a commercial power source.
3. A carbon monoxide detection system in accordance with Section 915.5 shall be an acceptable alternative to carbon monoxide alarms.))

**[W] 1103.9 Carbon monoxide alarms.** Existing Group I or Group R occupancies shall be equipped with single station carbon monoxide alarms in accordance with Section 915.4.3. An inspection will occur when alterations, repairs or additions requiring a permit occur, or when one or more sleeping rooms are added or created. The carbon monoxide alarms shall be *listed* as complying with UL 2034, and be installed and maintained in accordance with NFPA 720-2015 and the manufacturer's instructions.

### **Exceptions:**

1. For other than R-2 occupancies, if the building does not contain a fuel-burning appliance, a fuel-burning fireplace, or an attached garage.
2. Work involving the exterior surfaces of dwellings, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck, or electrical permits.
3. Installation, alteration or repairs of noncombustible plumbing or mechanical systems.
4. Sleeping units or dwelling units in I and R-1 occupancies and R-2 college dormitories, hotel, DOC prisons and work releases and assisted living facilities and residential treatment facilities licensed by the state of Washington which do not themselves contain a fuel-burning appliance, a fuel-burning fireplace, or an attached garage, need not be provided with carbon monoxide alarms provided that:
  - 4.1. The sleeping units or dwelling unit is not adjacent to any room which contains a fuel-burning appliance, a fuel-burning fireplace, or an attached garage; and
  - 4.2. The sleeping units or dwelling unit is not connected by duct work or ventilation shafts with a supply or return register in the same room to any room containing a fuel-burning appliance, a fuel-burning fireplace, or to an attached garage; and
  - 4.3. The building is provided with a common area carbon monoxide detection system.
5. An open parking garage, as defined in the *International Building Code*, or enclosed parking garage ventilated in accordance with Section 404 of the *International Mechanical Code* is not considered an attached garage.

**1103.10 Medical gases.** Medical gases stored and transferred in health-care-related facilities shall be in accordance with Chapter 53.

## SECTION 1104 MEANS OF EGRESS FOR EXISTING BUILDINGS

**[W][S] 1104.1 General.** *Means of egress* in existing buildings shall comply with ((the minimum egress requirements where specified in Table 1103.1 as further enumerated in Sections 1104.2 through 1104.25, and the building code that applied at the time of construction)) Section 1032 and Sections 1104.2 through 1104.25. ((Where the provisions of this chapter conflict with the building code that applied at the time of construction, the most restrictive provision shall apply. Existing buildings that were not required to comply with a building code at the time of construction shall comply with the minimum egress requirements where specified in Table 1103.1 as further enumerated in Sections 1104.2 through 1104.25.))

**Exception:** Means of egress conforming to the requirements of the building code under which they were constructed and Section 1032 shall not be required to comply with Sections 1104.2 through 1104.22 and 1104.25.

**1104.2 Elevators, escalators and moving walks.** Elevators, escalators and moving walks shall not be used as a component of a required *means of egress*.

### **Exceptions:**

1. Elevators used as an *accessible means of egress* where allowed by Section 1009.4.

**Exceptions:**

1. Separation from the interior of the building is not required for buildings that are two stories or less above grade where the *level of exit discharge* serving such occupancies is the first story above grade.
2. Separation from the interior of the building is not required where the exterior *stairway* is served by an exterior balcony that connects two remote exterior *stairways* or other *approved exits*, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the opening not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the interior of the building is not required for an exterior *stairway* located in a building or structure that is permitted to have unenclosed interior *stairways* in accordance with Section 1023.
4. Separation from the *open-ended corridors* of the building is not required for exterior *stairways* provided that:
  - 4.1. The *open-ended corridors* comply with Section 1020.
  - 4.2. The *open-ended corridors* are connected on each end to an *exterior exit stairway* complying with Section 1027.
  - 4.3. At any location in an *open-ended corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3 m<sup>2</sup>) or an exterior *stairway* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

**1104.23 Minimum aisle width.** The minimum clear width of *aisles* shall comply with the following:

1. Forty-two inches (1067 mm) for stepped aisles having seating on each side.

**Exception:** Thirty-six inches (914 mm) where the stepped *aisle* serves fewer than 50 seats.
2. Thirty-six inches (914 mm) for stepped *aisles* having seating on only one side.

**Exceptions:**

  1. Thirty inches (760 mm) for catchment areas serving not more than 60 seats.
  2. Twenty-three inches (584 mm) between a stepped aisle *handrail* and seating where a stepped *aisle* does not serve more than five rows on one side.

3. Twenty inches (508 mm) between a stepped *aisle handrail* or guard and seating where the *aisle* is subdivided by a mid-aisle *handrail*.
4. Forty-two inches (1067 mm) for level or ramped *aisles* having seating on both sides.

**Exceptions:**

  1. Thirty-six inches (914 mm) where the *aisle* serves fewer than 50 seats.
  2. Thirty inches (760 mm) where the *aisle* serves fewer than 15 seats and does not serve as part of an *accessible route*.

5. Thirty-six inches (914 mm) for level or ramped *aisles* having seating on only one side.

**Exception:** Thirty inches (760 mm) for catchment areas serving not more than 60 seats and not serving as part of an *accessible route*.
6. In Group I-2, where *aisles* are used for movement of patients in beds, *aisles* shall comply with Section 1105.6.8.

**1104.24 Stairway floor number signs.** Existing *stairways* shall be marked in accordance with Section 1023.9.

**1104.25 Egress path markings.** Existing high-rise buildings of Group A, B, E, I, M and R-1 occupancies shall be provided with luminous *egress* path markings in accordance with Section 1025.

**Exception:** Open, unenclosed stairwells in historic buildings designated as historic under a state or local historic preservation program.

**SECTION 1105**  
**((CONSTRUCTION)) REQUIREMENTS FOR EXISTING GROUP I-2**

**[W][S] 1105.1 General.** This section shall be applied by jurisdictions conducting surveys for compliance with federal centers for Medicare and Medicaid reimbursement program. Existing Group I-2 shall meet all of the following requirements:

1. The minimum fire safety requirements in Section 1103.
2. The minimum *means of egress* requirements in Section 1104.
3. The additional egress and ((construction)) requirements in Section 1105.

**CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS**

Where the provisions of this chapter conflict with the ((construction)) requirements that applied at the time of construction, the most restrictive provision shall apply.

**1105.2 Applicability.** The provisions of Sections 1105.3 through 1105.8, 1105.10 and 1105.11 shall apply to the existing Group I-2 *fire area*.

**1105.3 Construction.** Group I-2, Condition 2 shall not be located on a floor level higher than the floor level limitation in Table 1105.3 based on the type of construction.

**TABLE 1105.3  
FLOOR LEVEL LIMITATIONS FOR GROUP I-2, CONDITION 2**

CONSTRUCTION TYPE	AUTOMATIC SPRINKLER SYSTEM	ALLOWABLE FLOOR LEVEL <sup>a</sup>			
		1	2	3	4 or more
IA	Note b	P	P	P	P
	Note c	P	P	P	P
IB	Note b	P	P	P	P
	Note c	P	P	P	P
IIA	Note b	P	P	P	NP
	Note c	P	NP	NP	NP
IIB	Note b	P	P	NP	NP
	Note c	NP	NP	NP	NP
IIIA	Note b	P	P	NP	NP
	Note c	P	NP	NP	NP
IIIB	Note b	P	NP	NP	NP
	Note c	NP	NP	NP	NP
IV	Note b	P	P	NP	NP
	Note c	NP	NP	NP	NP
VA	Note b	P	P	NP	NP
	Note c	NP	NP	NP	NP
VB	Note b	P	NP	NP	NP
	Note c	NP	NP	NP	NP

P = Permitted; NP = Not Permitted.

- a. Floor level shall be counted based on the number of stories above grade.
- b. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
- c. The building is equipped with an automatic sprinkler system in accordance with Section 1105.8.

**1105.4 Incidental uses in existing Group I-2.** Incidental uses associated with and located within existing single-occupancy or mixed-occupancy Group I-2 buildings and that generally pose a greater level of risk to such occupancies shall comply with the provisions of Sections 1105.4.1 through 1105.4.3.2.1. Incidental uses in Group I-2 occupancies are limited to those listed in Table 1105.4.

## CHAPTER 12

# ENERGY SYSTEMS

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**User note:**

**About this chapter:** Chapter 12 was added to address the current energy systems found in this code, and is provided for the introduction of a wide range of systems to generate and store energy in, on and adjacent to buildings and facilities. The expansion of such energy systems is related to meeting today's energy, environmental and economic challenges. Ensuring appropriate criteria to address the safety of such systems in building and fire codes is an important part of protecting the public at large, building occupants and emergency responders. More specifically, this chapter addresses standby and emergency power, portable generators, photovoltaic systems, fuel cell energy systems, and energy storage systems.

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### SECTION 1201 GENERAL

**[W][S] 1201.1 Scope.** The provisions of this chapter shall apply to the installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning of energy systems used for generating or storing energy including but not limited to energy storage systems under the exclusive control of an electric utility or lawfully designated agency and emergency power systems and legally required standby power systems. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency. Energy storage systems regulated by Section 1207 shall comply with this chapter as appropriate and NFPA 855.

**1201.2 Electrical wiring and equipment.** Electrical wiring and equipment used in connection with energy systems shall be installed and maintained in accordance with this chapter, Section 603 and NFPA 70.

**[W] 1201.3 Mixed system installation.** Where mixed systems are approved, the aggregate nameplate kWh energy of all energy storage systems in a *fire area* shall not exceed the maximum quantity specified for any of the energy systems in this chapter. Where required by the *fire code official*, a hazard mitigation analysis shall be provided and *approved* in accordance with Section 104.8.2 to evaluate any potential adverse interaction between the various energy systems and technologies.

### SECTION 1202 DEFINITIONS

**1202.1 Definitions.** The following terms are defined in Chapter 2:

**BATTERY SYSTEM, STATIONARY STORAGE.**

**BATTERY TYPES.**

**CAPACITOR ENERGY STORAGE SYSTEM.**

**CRITICAL CIRCUIT.**

**EMERGENCY POWER SYSTEM.**

**ENERGY STORAGE MANAGEMENT SYSTEMS.**

**ENERGY STORAGE SYSTEM (ESS).**

**ENERGY STORAGE SYSTEM,  
ELECTROCHEMICAL.**

**ENERGY STORAGE SYSTEM, MOBILE.**

**ENERGY STORAGE SYSTEM, WALK-IN UNIT.**

**ENERGY STORAGE SYSTEM CABINET.**

**ENERGY STORAGE SYSTEM COMMISSIONING.**

**ENERGY STORAGE SYSTEM DECOMMISSIONING.**

**FUEL CELL POWER SYSTEM, STATIONARY.**

**PORTABLE GENERATOR.**

**STANDBY POWER SYSTEM.**

## ENERGY SYSTEMS

### [S] SECTION 1203 EMERGENCY AND LEGALLY REQUIRED STANDBY POWER SYSTEMS

[S] **1203.1 General.** Emergency power systems and legally required standby power systems required by this code or the *International Building Code* shall comply with Sections 1203.1.1 through 1203.1.9.

**1203.1.1 Stationary generators.** Stationary emergency and legally required standby power generators required by this code shall be *listed* in accordance with UL 2200.

**1203.1.2 Fuel line piping protection.** Fuel lines supplying a generator set inside a high-rise building shall be separated from areas of the building other than the room the generator is located in by one of the following methods:

1. A fire-resistant pipe-protection system that has been tested in accordance with UL 1489. The system shall be installed as tested and in accordance with the manufacturer's installation instructions, and shall have a rating of not less than ~~((2 hours. Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, the required rating shall be reduced to))~~ 1 hour.
2. An assembly that has a *fire-resistance rating* of not less than 2 hours. Where the building is protected throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, the required *fire-resistance rating* shall be reduced to 1 hour.
3. Other *approved* methods.

[S] **1203.1.3 Installation.** Emergency power systems and legally required standby power systems shall be installed in accordance with the *International Building Code*, ~~((NFPA 70))~~ Seattle Electrical Code, NFPA 110 and NFPA 111.

#### **Exceptions:**

1. Where located within a sprinklered parking garage of Type I or II construction, emergency power and legally required standby power systems with fixed fuel quantities meeting the limits of Section 605.4.2.2, and their transfer switches, are not required to be in a separate room. Other occupancies located in the story where the system is located shall be separated from the system by fire barriers with a minimum 1-hour fire-resistance rating.
2. Combustion and radiator intake air are permitted to be transferred from the adjacent garage. Radiator discharge air is permitted to be transferred to the adjacent garage. Radiator ventilation intake and discharge air locations shall be separated to maintain the radiator ventilation intake air temperature below the maximum temperature allowed to meet the emergency and legally required standby power system loads.

[S] **1203.1.4 Load transfer.** Emergency power systems shall automatically provide secondary power within 10 seconds after primary power is lost, unless specified otherwise in this code. ~~((Standby))~~ Legally required standby power systems shall automatically provide secondary power within 60 seconds after primary power is lost, unless specified otherwise in this code.

[S] **1203.1.5 Load duration.** Emergency power systems and legally required standby power systems shall be designed to provide the required power for a minimum duration of ~~((2))~~ 8 hours without being refueled or recharged, unless specified otherwise in this code.

**Exception:** The minimum duration of all required power loads may be reduced to 2 hours for all systems except for fire pumps that require a minimum duration of 8 hours in accordance with NFPA 20.

**1203.1.6 Uninterruptable power source.** An uninterrupted source of power shall be provided for equipment where required by the manufacturer's instructions, the listing, this code or applicable referenced standards.

[S] **1203.1.7 Interchangeability.** Emergency power systems shall be an acceptable alternative for installations that require legally required standby power systems.

**1203.1.8 Group I-2 occupancies.** In Group I-2 occupancies located in flood hazard areas established in Section 1612.3 of the *International Building Code* where new essential electrical systems are installed, and where new essential electrical system generators are installed, the systems and generators shall be located and installed in accordance with ASCE 24. Where connections for hook up of temporary generators are provided, the connections shall be located at or above the elevation required in ASCE 24.

**1203.1.9 Maintenance.** Existing installations shall be maintained in accordance with the original approval and Section 1203.4.

[S] **1203.2 Where required.** Emergency and legally required standby power systems shall be provided where required by Sections 1203.2.1 through 1203.2.19.

**1203.2.1 Ambulatory care facilities.** Essential electrical systems for ambulatory care facilities shall be in accordance with Section 422.6 of the *International Building Code*.

**1203.2.2 Elevators and platform lifts.** ~~((Standby))~~ Emergency power shall be provided for elevators and platform lifts as required in Sections 604.3, 1009.4.1 and 1009.5.

**1203.2.3 Emergency responder communication coverage systems.** ~~((Standby))~~ Legally required standby power shall be provided for in-building, two-way emergency responder communication coverage systems as required in Section 510.4.2.3. The standby power supply shall be capable of operating the in-building, two-way emergency responder communication coverage system at 100-percent system operation capacity for a duration of not less than 12 hours.

**1203.2.4 Emergency voice/alarm communication systems.** ~~((Standby))~~ Legally required standby power shall be provided for emergency voice/alarm communication systems in accordance with NFPA 72.

**1203.2.5 Exhaust ventilation.** Standby power shall be provided for mechanical exhaust ventilation systems as required in Section 1207.6.1.2.1. The system shall be capable of powering the required load for a duration of not less than 2 hours.

**1203.2.6 Exit signs.** Emergency power shall be provided for exit signs as required in Section 1013.6.3. The system shall be capable of powering the required load for a duration of not less than 90 minutes.

**1203.2.7 Gas detection systems.** Emergency power shall be provided for gas detection systems where required by Sections 1203.2.10 and 1203.2.17. ~~((Standby))~~ Legally required standby power shall be provided for gas detection systems where required by Sections 916.5 and 1207.6.1.2.4.

**1203.2.8 Group I-2 occupancies.** Essential electrical systems for Group I-2 occupancies shall be in accordance with Section 407.11 of the *International Building Code*.

**1203.2.9 Group I-3 occupancies.** Power-operated sliding doors or power-operated locks for swinging doors in Group I-3 occupancies shall be operable by a manual release mechanism at the door. Emergency power shall be provided for the doors and locks.

**Exceptions:**

1. Emergency power is not required in facilities where provisions for remote locking and unlocking of occupied rooms in Occupancy Condition 4 are not required as set forth in the *International Building Code*.
2. Emergency power is not required where remote mechanical operating releases are provided.

**1203.2.10 Hazardous materials.** Emergency ~~((and))~~ or legally required standby power shall be provided in occupancies with hazardous materials as required in the following sections:

1. Sections 5004.7 and 5005.1.5 for hazardous materials.
2. Sections 6004.2.2.8 and 6004.3.4.2 for highly toxic and toxic gases.
3. Section 6204.1.11 for organic peroxides.

**1203.2.11 High-rise buildings.** ~~((Standby power and emergency))~~ Emergency power shall be provided for high-rise buildings as required in Section 403 of the *International Building Code*, and shall be in accordance with Section 1203.

**1203.2.12 Special purpose horizontal sliding doors.** ~~((Standby))~~ Legally required standby power shall be provided for horizontal sliding doors as required in Section 1010.3.3. The legally required standby power supply shall have a capacity to operate not fewer than 50 closing cycles of the door.

**1203.2.13 Hydrogen fuel gas rooms.** ~~((Standby))~~ Legally required standby power shall be provided for hydrogen fuel gas rooms as required by Section 5808.7.

**1203.2.14 Laboratory suites.** ~~((Standby))~~ Legally required standby or emergency power shall be provided in accordance with Section 5004.7 where *laboratory suites* are located above the sixth story above *grade plane* or located in a story below *grade plane*.

**1203.2.15 Means of egress illumination.** Emergency power shall be provided for *means of egress* illumination in accordance with Sections 1008.3 and 1104.5.1.

**1203.2.16 Membrane structures.** ~~((Standby))~~ Legally required standby power shall be provided for auxiliary inflation systems in permanent membrane structures in accordance with Section 2702 of the *International Building Code*. Auxiliary inflation systems shall be provided in temporary air-supported and air-inflated membrane structures in accordance with Section 3103.10.4.

**1203.2.17 Semiconductor fabrication facilities.** Emergency power shall be provided for semiconductor fabrication facilities as required in Section 2703.15.

**1203.2.18 Smoke control systems.** ~~((Standby))~~ Emergency power shall be provided for smoke control systems as required in Sections 909.11, 909.20.5.7 and 909.21.5. Legally required standby power systems shall be provided for pressurization systems in low-rise buildings in accordance with Sections 909.20.6 and 909.21.5.

**1203.2.19 Underground buildings.** Emergency ~~((and standby))~~ power shall be provided in underground buildings as required in Section 405 of the *International Building Code* and shall be in accordance with Section 1203.

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**1203.3 Critical circuits.** Required *critical circuits* shall be protected using one of the following methods:

1. Cables used for survivability of required *critical circuits* shall be *listed* in accordance with UL 2196 and shall have a *fire-resistance rating* of not less than 1 hour.
2. Electrical circuit protective systems shall have a *fire-resistance rating* of not less than 1 hour. Electrical circuit protective systems shall be installed in accordance with their listing requirements.
3. Construction having a *fire-resistance rating* of not less than 1 hour.

[S] **1203.4 Maintenance.** Emergency and *legally required* standby power systems shall be maintained in accordance with NFPA 110 and NFPA 111 such that the system is capable of supplying service within the time specified for the type and duration required.

**1203.4.1 Group I-2 and ambulatory care facilities.** In Group I-2 occupancies and ambulatory care facilities, emergency and *legally required* standby power systems shall be maintained in accordance with NFPA 99.

**1203.4.2 Schedule.** Inspection, testing and maintenance of emergency and *legally required* standby power systems shall be in accordance with an *approved* schedule established upon completion and approval of the system installation.

**1203.4.3 Records.** Records of the inspection, testing and maintenance of emergency and *legally required* standby power systems shall include the date of service, name of the servicing technician, a summary of conditions noted and a detailed description of any conditions requiring correction and what corrective action was taken. Such records shall be maintained and shall be submitted to the fire code official in accordance with Administrative Rule 9.02.18, Inspection, Testing, Maintenance and Reporting Requirements for Fire Protection Systems, and any future revisions of this rule adopted by the fire code official.

**1203.4.4 Switch maintenance.** Emergency and *legally required* standby power system transfer switches shall be included in the inspection, testing and maintenance schedule required by Section 1203.4.2. Transfer switches shall be maintained free from accumulated dust and dirt. Inspection shall include examination of the transfer switch contacts for evidence of deterioration. When evidence of contact deterioration is detected, the contacts shall be replaced in accordance with the transfer switch manufacturer's instructions.

**1203.5 Operational inspection and testing.** Emergency and *legally required* power systems, including all appurtenant components, shall be inspected and tested under load in accordance with NFPA 110 and NFPA 111.

**Exception:** Where the emergency power system is used for *legally required* standby power or peak load shaving, such use shall be recorded and shall be allowed to be substituted for scheduled testing of the generator set, provided that appropriate records are maintained.

**1203.5.1 Group I-2 and ambulatory care facilities.** In Group I-2 occupancies and ambulatory care facilities, emergency and *legally required* standby power systems shall be inspected and tested under load in accordance with NFPA 99.

**1203.5.2 Transfer switch test.** The test of the transfer switch shall consist of electrically operating the transfer switch from the normal position to the alternate position and then return to the normal position.

**1203.6 Supervision of maintenance and testing.** Routine maintenance, inspection and operational testing shall be overseen by a properly instructed individual.

## SECTION 1204 PORTABLE GENERATORS

**1204.1 Portable generators.** The use, operation and maintenance of portable generators shall comply with this section.

**1204.2 Listing.** Portable generators manufactured after January 1, 2021, shall be *listed* and *labeled* in accordance with UL 2201.

**1204.3 Operation and maintenance.** Portable generators shall be operated and maintained in accordance with the manufacturer's instructions.

**1204.4 Grounding.** Portable generators shall be grounded in accordance with NFPA 70.

**1204.5 Operating locations.** Portable generators shall be operated only outdoors a minimum of 5 feet (1524 mm) from any building openings such as windows and doors or air intakes. Portable generators shall not be operated within buildings or enclosed areas. Additional separation shall be provided for tents, membrane structures and outdoor assembly events as specified in Chapter 31.

**1204.6 Cords and wiring.** Extension cords and temporary wiring used to connect portable generators shall be in accordance with Section 603 and shall be provided with GFCI protection.

**1204.7 Connections to premise wiring.** Connections to a premise wiring system shall comply with all of the following:

1. Power shall not be provided in a manner that "back-feeds" receptacles or the premise wiring system.

2. Connection to a premise served by commercial power shall be made through a *listed* transfer switch installed, used and maintained in accordance with NFPA 70.
3. Connection to buildings not served by commercial power shall comply with NFPA 70.

**1204.8 Refueling.** Portable generators shall not be refueled while operating.

**1204.9 Storage and repair.** Storage and repair of fuel-fired portable generators shall comply with Section 313.

**1204.10 Fire extinguisher.** A *listed* portable fire extinguisher complying with Section 906 with a minimum rating of 2-A:20-B:C shall be provided not more than 50 feet (15 240 mm) from the portable generator.

## SECTION 1205 SOLAR PHOTOVOLTAIC POWER SYSTEMS

**[W] 1205.1 General.** ~~((Solar))~~ Installation, modification, or alteration of solar photovoltaic (PV) power systems shall comply with this section. Due to the emerging technologies in the solar photovoltaic industry, it is understood *fire code officials* may need to amend prescriptive requirements of this section to meet the requirements for fire fighter access and product installations. Section 104.10, Alternative materials, design and methods of construction and equipment, shall be considered when approving the installation of solar photovoltaic power systems. Solar photovoltaic systems shall be installed in accordance with Sections 1205.2.1 through 1205.6, the *International Building Code* ~~((or International Residential Code))~~ and chapter 19.28 RCW. ~~((The electrical portion of solar PV systems shall be installed in accordance with NFPA 70. Rooftop mounted solar photovoltaic systems shall be installed in accordance with Sections 1205.2 through 1205.4.3. Ground mounted solar photovoltaic systems shall comply with Section 1205.5.))~~

**[S] 1205.2 Access and pathways.** Roof access, pathways and spacing requirements shall be provided in accordance with Sections 1205.2.1 through 1205.3.3. Pathways shall be over areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions, such as vent pipes, conduit or mechanical equipment.

### Exceptions:

1. Detached, nonhabitable Group U structures including, but not limited to, detached garages serving Group R-3 buildings, parking shade structures, carports, solar trellises and similar structures.
2. Roof access, pathways and spacing requirements need not be provided where the *fire code official* has determined that rooftop operations will not be employed.
3. Building-integrated photovoltaic (BIPV) systems where the BIPV systems are *approved*, integrated into the finished roof surface and are *listed* in accordance with ~~((a national test standard developed to address Section 690.12(B)(2) of NFPA 70))~~ UL 3741. The removal or cutting away of portions of the BIPV system during fire-fighting operations shall not expose a fire fighter to electrical shock hazards.

**[W] 1205.2.1 Solar photovoltaic (PV) systems for Group R-3 residential and buildings built under the International Residential Code.** Solar photovoltaic (PV) systems for Group R-3 residential and buildings built under the International Residential Code shall comply with Sections 1205.2.1.1 through 1205.2.3.

### Exceptions:

- ~~((1. These requirements shall not apply to structures designed and constructed in accordance with the *International Residential Code*.~~
2. These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (16.7 percent slope) or less.)
  1. Residential dwellings with an *approved* automatic fire sprinkler system installed.
  2. Residential dwellings with *approved* mechanical or passive ventilation systems.
  3. Where the *fire code official* determines that the slope of the roof is too steep for emergency access.
  4. Where the *fire code official* determines that vertical ventilation tactics will not be utilized.
  5. These requirements shall not apply to roofs where the total combined area of the solar array does not exceed 33 percent as measured in plan view of the total roof area of the structure, where the solar array will measure 1,000 square feet (93 m<sup>2</sup>) or less in area, and where a minimum 18 inches (457 mm) unobstructed pathway shall be maintained along each side of any horizontal ridge.

**1205.2.1.1 Pathways to ridge.** Not fewer than two ~~((36))~~ 18-inch-wide ~~((914))~~ 457 mm pathways on separate roof planes, from lowest roof edge to ridge, shall be provided on all buildings. Not fewer than one pathway shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic array, not fewer than one ~~((36))~~ 18-inch-wide ~~((914))~~ 457 mm pathway from lowest roof edge to ridge shall be provided on the same roof plane as the photovoltaic array, on an adjacent roof plane or straddling the same and adjacent roof planes.



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**1205.2.1.2 Setbacks at ridge.** For photovoltaic arrays occupying 33 percent or less of the plan view total roof area, a setback of not less than 18 inches (457 mm) wide is required on both sides of a horizontal ridge. For photovoltaic arrays occupying more than 33 percent of the plan view total roof area, a setback of not less than 36 inches (457 mm) wide is required on both sides of a horizontal ridge.

~~((1205.2.1.3 Alternative setbacks at ridge. Where an automatic sprinkler system is installed within the dwelling in accordance with Section 903.3.1.3, setbacks at the ridge shall conform to one of the following:~~

- ~~1. For photovoltaic arrays occupying 66 percent or less of the plan view total roof area, a setback of not less than 18 inches (457 mm) wide is required on both sides of a horizontal ridge.~~
- ~~2. For photovoltaic arrays occupying more than 66 percent of the plan view total roof area, a setback of not less than 36 inches (914 mm) wide is required on both sides of a horizontal ridge.)~~

**1205.2.2 Emergency escape and rescue openings.** Panels and modules installed on Group R-3 buildings shall not be placed on the portion of a roof that is below an emergency escape and rescue opening. A pathway of not less than 36 inches (914 mm) wide shall be provided to the emergency escape and rescue opening.

**[S] 1205.2.3 Building-integrated photovoltaic (BIPV) systems.** Where building-integrated photovoltaic (BIPV) systems are installed in a manner that creates areas with electrical hazards to be hidden from view, markings shall be provided to identify the hazardous areas to avoid for ladder placement. The markings shall be reflective and be visible from grade beneath the eaves or other location approved by the fire code official.

**Exception:** BIPV systems listed in accordance with ((Section 690.12(B)(2) of NFPA 70)) UL 3741, where the removal or cutting away of portions of the BIPV system during fire-fighting operations have been determined to not expose a fire fighter to electrical shock hazards.

**1205.3 Other than Group R-3 buildings.** Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with Sections 1205.3.1 through 1205.3.3.

**Exception:** Where it is determined by the *fire code official* that the roof configuration is similar to that of a Group R-3 occupancy, the residential access and ventilation requirements in Sections 1205.2.1.1 through 1205.2.1.3 are a suitable alternative.

**1205.3.1 Perimeter pathways.** There shall be a minimum 6-foot-wide (1829 mm) clear perimeter around the edges of the roof.

**Exception:** Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum width of 4 feet (1219 mm).

**1205.3.2 Interior pathways.** Interior pathways shall be provided between array sections to meet the following requirements:

1. Pathways shall be provided at intervals not greater than 150 feet (45 720 mm) throughout the length and width of the roof.
2. A pathway not less than 4 feet (1219 mm) wide in a straight line to roof standpipes or ventilation hatches.
3. A pathway not less than 4 feet (1219 mm) wide around roof access hatches, with not fewer than one such pathway to a parapet or roof edge.

**1205.3.3 Smoke ventilation.** The solar installation shall be designed to meet the following requirements:

1. Where nongravity-operated smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide shall be provided bordering all sides.
2. Where gravity-operated dropout smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide on not fewer than one side.
3. Smoke ventilation options between array sections shall be one of the following:
  - 3.1. A pathway not less than 8 feet (2438 mm) wide.
  - 3.2. A pathway not less than 4 feet (1219 mm) wide bordering 4-foot by 8-foot (1219 mm by 2438 mm) venting cutouts every 20 feet (6096 mm) on alternating sides of the pathway.

**1205.4 Buildings with rapid shutdown.** Buildings with rapid shutdown solar photovoltaic systems shall have permanent labels in accordance with Sections 1205.4.1 through 1205.4.3.

**1205.4.1 Rapid shutdown type.** The type of solar photovoltaic system rapid shutdown shall be labeled with one of the following:

1. For solar photovoltaic systems that shut down the array and the conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of 3/8 inch (10 mm) in black on a yellow background. The remaining characters shall be uppercase with a minimum height of 3/16 inch

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**1205.4.2 Buildings with more than one rapid shutdown type.** Solar photovoltaic systems that contain rapid shutdown in accordance with both Items 1 and 2 of Section 1205.4.1 or solar photovoltaic systems where only portions of the systems on the building contain rapid shutdown, shall provide a detailed plan view diagram of the roof showing each different photovoltaic system and a dotted line around areas that remain energized after the rapid shutdown switch is operated.

**1205.4.3 Rapid shutdown switch.** A rapid shutdown switch shall have a label located not greater than 3 feet (914 mm) from the switch that states the following:

### RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

**1205.5 Ground-mounted photovoltaic panel systems.** Ground-mounted photovoltaic panel systems shall be installed in accordance with this section. Setback requirements shall not apply to ground-mounted, free-standing photovoltaic arrays.

**1205.5.1 Vegetation control.** A clear, brush-free area of 10 feet (3048 mm) shall be required around the perimeter of the ground-mounted photovoltaic arrays. A maintained vegetative surface or a noncombustible base, *approved* by the *fire code official*, shall be installed and maintained under the photovoltaic arrays and associated electrical equipment installations.

### [W] 1205.6 Size of solar photovoltaic array.

1. Each photovoltaic array shall be limited to 150 feet (45 720 mm) by 150 feet (45 720 mm). Multiple arrays shall be separated by a 3-foot-wide (914 mm) clear access pathway.
2. Panels/modules shall be located up to the roof ridge where an alternative ventilation method *approved* by the *fire code official* has determined vertical ventilation techniques will not be employed.

## SECTION 1206 STATIONARY FUEL CELL POWER SYSTEMS

**[W] 1206.1 General.** *Stationary fuel cell power systems* in new and existing occupancies shall comply with this section.

**Exception:** The temporary use of a fuel cell-powered electric vehicle to power a Group R-3 or R-4 building while parked shall comply with Section (~~1206.14~~) 1206.13.

**1206.2 Permits.** Permits shall be obtained for *stationary fuel cell power systems* as set forth in Section 105.6.9.

**1206.3 Equipment.** *Stationary fuel cell power systems* shall comply with the following:

- Prepackaged fuel cell power systems* shall be *listed* and *labeled* in accordance with CSA FC 1.
- The modules and components in a *preengineered fuel cell power system* shall be *listed* and *labeled* in accordance with CSA FC 1 and interconnected to complete the assembly of the system at the job site in accordance with the manufacturer's instructions and the module and component listings.
- Field-fabricated fuel cell power systems* shall be *approved* based on a review of the technical report provided in accordance with Section 104.8.2. The report shall be prepared by and bear the stamp of a *registered design professional* and shall include:
  - A fire risk evaluation.
  - An evaluation demonstrating that modules and components in the fuel cell power system comply with applicable requirements in CSA FC 1.
  - Documentation of the fuel cell power system's compliance with applicable NFPA 2 and NFPA 853 construction requirements.

**1206.4 Installation.** *Stationary fuel cell power systems* shall be installed and maintained in accordance with NFPA 70 and NFPA 853, the manufacturer's installation instructions, and the listing. *Stationary fuel cell power systems* fueled by hydrogen shall be installed and maintained in accordance with NFPA 2 and NFPA 70, the manufacturer's installation instructions and the listing.

**[W] 1206.5 Residential use.** *Stationary fuel cell power systems* shall not be installed in Group R-3 and R-4 buildings, or *dwelling units* associated with Group R-2 buildings unless they are specifically *listed* for residential use.

**Exception:** The temporary use of a fuel cell-powered electric vehicle to power a Group R-3 or R-4 building while parked shall comply with Section (~~1206.14~~) 1206.13.

**1206.6 Indoor installations.** *Stationary fuel cell power systems* installed in indoor locations shall comply with Sections 1206.6 through 1206.6.2. For purposes of this section, an indoor location includes a roof and 50 percent or greater enclosing walls.

**1206.6.1 Listed.** *Stationary fuel cell power systems* installed indoors shall be specifically *listed* and *labeled* for indoor use.

**1206.6.2 Separation.** Rooms containing *stationary fuel cell power systems* shall be separated from the following occupancies by *fire barriers* or *horizontal assemblies*, or both, constructed in accordance with the *International Building Code*.

1. Group B, F, M, S and U occupancies by 1-hour *fire-resistance-rated* construction.
2. Group A, E, I and R occupancies by 2-hour *fire-resistance-rated* construction.

**Exception:** *Stationary fuel cell power systems* with an aggregate rating less than 50 kW shall not be required to be separated from other occupancies provided that the systems comply with Section 9.3 of NFPA 853.

**[W] ((1206.13)) 1206.6.3 Gas detection systems.** *Stationary fuel cell power systems* shall be provided with a gas detection system. Detection shall be provided in *approved* locations in the fuel cell power system enclosure, the exhaust system or the room that encloses the fuel cell power system. The system shall be designed to activate at a flammable gas concentration of not more than 25 percent of the lower flammable limit (LFL). \*\*

**[W] ((1206.13.1)) 1206.6.3.1 System activation.** The activation of the gas detection system shall automatically:

1. Close valves between the gas supply and the fuel cell power system.
2. Shut down the fuel cell power system.
3. Initiate local audible and visible alarms in *approved* locations.

**1206.7 Vehicle impact protection.** Where *stationary fuel cell power systems* are subject to impact by a motor vehicle, vehicle impact protection shall be provided in accordance with Section 312.

**1206.8 Outdoor installation.** *Stationary fuel cell power systems* located outdoors shall be separated by not less than 5 feet (1524 mm) from the following:

1. Lot lines.
2. Public ways.
3. Buildings.
4. Stored combustible materials.
5. Hazardous materials.
6. High-piled stock.
7. Any portion of a designated *means of egress* system.
8. Other exposure hazards.

**1206.9 Fuel supply.** The design, location and installation of the fuel supply for *stationary fuel cell power systems* shall comply with Chapter 53, Chapter 58 and the *International Fuel Gas Code*, based on the particular fuel being supplied to the system.

**1206.10 Manual shutoff.** Access to a manual shutoff valve shall be provided for the fuel piping within 6 feet (1829 mm) of any fuel storage tank serving the fuel cell and within 6 feet (1829 mm) of the power system. If the fuel tank and the *stationary fuel cell power system* are less than 12 feet (3658 mm) apart, a single shutoff valve shall be permitted. If the *stationary fuel cell power system* is located indoors, the shutoff valve shall be located outside of the room in which the system is installed, unless otherwise *approved* by the *fire code official*.

**1206.11 Ventilation and exhaust.** Ventilation and exhaust for stationary fuel cell power systems shall be provided in accordance with NFPA 853.

**1206.12 Fire protection.** Fire protection systems for stationary fuel cell power system installations shall be provided in accordance with NFPA 853. \*

**((1206.14)) 1206.13 Group R-3 and R-4 fuel cell vehicle energy storage system use.** The temporary use of the *dwelling unit owner* or occupant's fuel cell-powered electric vehicle to power a Group R-3 or R-4 dwelling while parked in an attached or detached garage or outside shall comply with the vehicle manufacturer's instructions and NFPA 70.

## SECTION 1207 ELECTRICAL ENERGY STORAGE SYSTEMS (ESS)

**[W] 1207.1 General.** The provisions in this section are applicable to stationary and mobile electrical energy storage systems (ESS). ←

**Exception:** ESS in Group R-3 and R-4 occupancies not exceeding thresholds in Section 1207.11.4 shall comply with Section 1207.11 through 1207.11.9.

**[W][S] 1207.1.1 Utilities and industrial applications.** This section shall not apply to capacitors and capacitor equipment for electric utilities and industrial facilities used in applications such as flexible AC transmission (FACTS) devices, filter capacitor banks, power factor correction, and standalone capacitor banks for voltage correction and stabilization.

**[W][S] 1207.1.2 Mobile ESS.** Mobile ESS deployed at an electric utility substation or generation facility for 90 days or less shall not add to the threshold values in Table 1207.1.3 for the stationary ESS installation if both of the following conditions apply:

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1. The mobile ESS complies with Section 1207.10.
2. The mobile ESS is only being used during periods in which the facility’s stationary ESS is being tested, repaired, retrofitted or replaced.

**[W][S] ((1207.1.1)) 1207.1.3 Scope.** ESS having capacities exceeding the values shown in Table ((1207.1.1)) 1207.1.3 shall comply with this section.

**[W][S] TABLE ((1207.1.4)) 1207.1.3  
ENERGY STORAGE SYSTEM (ESS) THRESHOLD QUANTITIES**

TECHNOLOGY	ENERGY CAPACITY <sup>a</sup>
Capacitor ESS	3 kWh
Flow batteries <sup>b</sup>	20 kWh
Lead-acid batteries, all types	70 kWh <sup>c</sup>
Lithium-ion batteries	20 kWh
<del>((Nickel metal hydride (Ni-MH)))</del>	<del>((70 kWh))</del>
<u>Sodium nickel chloride batteries</u>	<u>70 kWh</u>
Nickel-cadmium batteries (Ni-Cd), <u>nickel metal hydride (Ni-MH), and</u> <u>nickel zinc (Ni-Zn) batteries</u>	70 kWh
<u>Non-electrochemical ESS<sup>d</sup></u>	<u>70 kWh</u>
Other battery technologies	10 kWh
Other electrochemical ESS technologies	3 kWh
<u>Zinc manganese dioxide batteries (Zn-MnO<sub>2</sub>)</u>	<u>70 kWh</u>

For SI: 1 kilowatt hour = 3.6 megajoules.

- a. Energy capacity is the total energy capable of being stored (nameplate rating), not the usable energy rating. For units rated in amp-hours, kWh shall equal rated voltage times amp-hour rating divided by 1,000.
- b. Shall include vanadium, zinc-bromine, polysulfide-bromide and other flowing electrolyte-type technologies.
- c. Fifty gallons of lead-acid battery electrolyte shall be considered equivalent to 70 kWh.
- d. Covers nonelectrochemical technologies such as flywheel and thermal ESS.

**((1207.1.2)) 1207.1.4 Permits.** Permits shall be obtained for ESS as follows:

1. ~~((Construction))~~ Installation permits shall be obtained for stationary ESS installations and for mobile ESS charging and storage installations covered by Section 1207.10.1. Permits shall be obtained in accordance with Section 105.6.5.
2. Operational permits shall be obtained for stationary ESS installations and for mobile ESS deployment operations covered by Section 1207.10.3. Permits shall be obtained in accordance with Section ~~((105.5.14))~~ 105.5.16.

**((1207.1.2.1)) 1207.1.4.1 Communication utilities.** Operational permits shall not be required for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 voltage alternating current (VAC) and 60 voltage direct current (VDC).

**[W][S] ((1207.1.3)) 1207.1.5 Construction documents.** The following information shall be provided with the permit application:

1. Location and layout diagram of the room or area in which the ESS is to be installed.
2. Details on the hourly *fire-resistance ratings* of assemblies enclosing the ESS.
3. The quantities and types of ESS to be installed.
4. Manufacturer’s specifications, ratings and documentation of the listings of each ESS and associated equipment.
5. Description of energy (battery) management systems and their operation.
6. Location and content of required signage.
7. Details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust and *deflagration venting* systems, if provided.
8. Support arrangement associated with the installation, including any required seismic restraint.
9. A commissioning plan complying with Section 1207.2.1.
10. A decommissioning plan complying with Section 1207.2.3.
11. A fire safety and evacuation plan in accordance with Section 404.

**1207.1.5.1 Utilities applicability.** Plans and specifications associated with ESS owned and operated by electric utilities as a component of the electric grid that are considered critical infrastructure documents in accordance with the provi-

sions of the North American Electric Reliability Corporation and other applicable governmental laws and regulations shall be made available to the fire code official for viewing based on the requirements of the applicable governmental laws and regulations.

**[W][S] ((1207.1.4)) 1207.1.6 Hazard mitigation analysis.** A failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided in accordance with Section 104.8.2 under any of the following conditions:

1. Where ESS technologies not specifically identified in Table ((1207.1.1)) 1207.1.3 are provided.
2. More than one ESS technology is provided in a ((room or enclosed)) single fire area where there is a potential for adverse interaction between technologies.
3. Where allowed as a basis for increasing maximum allowable quantities. See Section 1207.5.2.
4. Where flammable gases can be produced under abnormal conditions.
5. Where required by the fire code official to address a potential hazard with an ESS installation that is not addressed by existing requirements.

**[W][S] ((1207.1.4.1)) 1207.1.6.1 Fault condition.** The hazard mitigation analysis shall evaluate the consequences of the following failure modes. Only single failure modes shall be considered.

1. A thermal runaway condition in a single electrochemical ESS ((~~rack, module or~~) unit.
2. A mechanical failure of a non-electrochemical ESS unit.
2. ~~3.~~ Failure of any battery (energy) management system or fire protection system within the ESS equipment that is not covered by the product listing failure mode effects analysis (FMEA).
3. ~~4.~~ Failure of any required ((ventilation or exhaust system)) protection system external to the ESS including but not limited to ventilation (HVAC), exhaust ventilation, smoke detection, fire detection, gas detection or fire suppression system.
4. ~~Voltage surges on the primary electric supply.~~
5. ~~Short circuits on the load side of the ESS.~~
6. ~~Failure of the smoke detection, fire detection, fire suppression or gas detection system.~~
7. ~~Required spill neutralization not being provided or failure of a required secondary containment system.)~~

**[W][S] ((1207.1.4.2)) 1207.1.6.2 Analysis approval.** The fire code official is authorized to approve the hazardous mitigation analysis provided that the consequences of the hazard mitigation analysis demonstrate:

1. Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance-rated separations identified in Section 1207.7.4.
2. Fires ((in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate)) involving the ESS will allow occupants or the general public to evacuate to a safe location.
3. ~~Toxic and highly toxic gases released during fires will not reach concentrations in excess of the IDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate occupants from any affected area.~~
4. ~~Flammable gases released from ESS during charging, discharging and normal operation will not exceed 25 percent of their lower flammability limit (LFL).~~
5. ~~Flammable gases released from ESS during fire, overcharging and other abnormal conditions will be controlled through the use of ventilation of the gases, preventing accumulation, or by deflagration venting.)~~

**((1207.1.4.3)) 1207.1.6.3 Additional protection measures.** Construction, equipment and systems that are required for the ESS to comply with the hazardous mitigation analysis, including but not limited to those specifically described in Section 1207, shall be installed, maintained and tested in accordance with nationally recognized standards and specified design parameters.

**[W][S] ((1207.1.5)) 1207.1.7 Large-scale fire test.** Where required elsewhere in Section 1207, large-scale fire testing shall be conducted on a representative ESS in accordance with UL 9540A. The testing shall be conducted or witnessed and reported by an approved testing laboratory and show that a fire involving one ESS will not propagate to an adjacent ESS, and where installed within buildings, enclosed areas and walk-in units will be contained within the room, enclosed area or walk-in unit for ((a)) the duration ((equal to the fire-resistance rating of the room separation specified in Section 1207.7.4)) of the test. The test report shall be provided to the fire code official for the review and approval in accordance with Section 104.8.2.

**((1207.1.6)) 1207.1.8 Fire remediation.** Where a fire or other event has damaged the ESS and ignition or re-ignition of the ESS is possible, the system owner, agent or lessee shall take the following actions, at their expense, to mitigate the hazard or remove damaged equipment from the premises to a safe location.

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**[W][S] ((1207.1.6.1)) 1207.1.8.1 Fire mitigation personnel.** Where, in the opinion of the *fire code official*, it is essential for public safety that trained personnel be on-site to respond to possible ignition or re-ignition of a damaged ESS, the system owner, agent or lessee shall ((immediately)) dispatch within 15 minutes one or more fire mitigation personnel to the premise, as required and *approved*, at their expense. These personnel shall remain on duty continuously after the fire department leaves the premise until the damaged energy storage equipment is removed from the premises, or earlier if the *fire code official* indicates the public safety hazard has been abated.

**((1207.1.6.2)) 1207.1.8.2 Duties.** On-duty fire mitigation personnel shall have the following responsibilities:

1. Keep a diligent watch for fires, obstructions to *means of egress* and other hazards.
2. Immediately contact the fire department if their assistance is needed to mitigate any hazards or extinguish fires.
3. Take prompt measures for remediation of hazards in accordance with the decommissioning plan per Section 1207.2.3.
4. Take prompt measures to assist in the evacuation of the public from the structures.

**1207.2 Commissioning, decommissioning, operation and maintenance.** Commissioning, decommissioning, operation and maintenance shall be conducted in accordance with this section.

**[W][S] 1207.2.1 Commissioning.** Commissioning of newly installed ESS and existing ESS that have been retrofitted, replaced or previously decommissioned and are returning to service shall be conducted prior to the ESS being placed in service in accordance with a commissioning plan that has been *approved* prior to initiating commissioning. The commissioning plan shall include the following:

1. A narrative description of the activities that will be accomplished during each phase of commissioning, including the personnel intended to accomplish each of the activities.
2. A listing of the specific ESS and associated components, controls and safety-related devices to be tested, a description of the tests to be performed and the functions to be tested.
3. Conditions under which all testing will be performed, which are representative of the conditions during normal operation of the system.
4. Documentation of the owner's project requirements and the basis of design necessary to understand the installation and operation of the ESS.
5. Verification that required equipment and systems are installed in accordance with the *approved* plans and specifications.
6. Integrated testing for all fire and safety systems.
7. Testing for any required thermal management, ventilation or exhaust systems associated with the ESS installation.
8. Preparation and delivery of operation and maintenance documentation.
9. Training of facility operating and maintenance staff.
10. Identification and documentation of the requirements for maintaining system performance to meet the original design intent during the operation phase.
11. Identification and documentation of personnel who are qualified to service, maintain and decommission the ESS, and respond to incidents involving the ESS, including documentation that such service has been contracted for.
12. A decommissioning plan for removing the ESS from service, and from the facility in which it is located. The plan shall include details on providing a safe, orderly shutdown of energy storage and safety systems with notification to the code officials prior to the actual decommissioning of the system. The decommissioning plan shall include contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event.

**Exceptions:** Commissioning shall not be required for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC. A decommissioning plan shall be provided and maintained where required by the *fire code official*.

1. Lead-acid and nickel-cadmium battery systems less than 50 VAC, 60 VDC that are in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities and located outdoors or in building spaces or walk-in units used exclusively for such installations that are in compliance with NFPA 76 shall be permitted to have a commissioning plan in compliance with recognized industry practices in lieu of complying with Section 1207.2.1.
2. Lead-acid and nickel-cadmium battery systems that are used for VDC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utilities, and located in building spaces or walk-in units used exclusively for such installations shall be permitted to have a commissioning plan in compliance with applicable governmental laws and regulations in lieu of developing a commissioning plan in accordance with Section 1207.2.1.

**1207.2.1.1 Initial acceptance testing.** During the commissioning process an ESS shall be evaluated for proper operation in accordance with the manufacturer's instructions and the commissioning plan prior to final approval.

**1207.2.1.2 Commissioning report.** A report describing the results of the system commissioning, including the results of the initial acceptance testing required in Section 1207.2.1.1, shall be provided to the *fire code official* prior to final inspection and approval and maintained at an *approved* on-site location.

**1207.2.2 Operation and maintenance.** An operation and maintenance manual shall be provided to both the ESS *owner* or their authorized agent and the ESS operator before the ESS is put into operation and shall include the following:

1. Manufacturer's operation manuals and maintenance manuals for the entire ESS, or for each component of the system requiring maintenance, that clearly identify the required routine maintenance actions.
2. Name, address and phone number of a service agency that has been contracted to service the ESS and its associated safety systems.
3. Maintenance and calibration information, including wiring diagrams, control drawings, schematics, system programming instructions and control sequence descriptions, for all energy storage control systems.
4. Desired or field-determined control set points that are permanently recorded on control drawings at control devices or, for digital control systems, in system programming instructions.
5. A schedule for inspecting and recalibrating all ESS controls.
6. A service record log form that lists the schedule for all required servicing and maintenance actions and space for logging such actions that are completed over time and retained on-site.

The ESS shall be operated and maintained in accordance with the manual and a copy of the manual shall be retained at an *approved* on-site location.

**1207.2.2.1 Ongoing inspection and testing.** Systems that monitor and protect the ESS installation shall be inspected and tested in accordance with the manufacturer's instructions and the operation and maintenance manual. Inspection and testing records shall be maintained in the operation and maintenance manual.

**1207.2.3 Decommissioning.** The code official shall be notified prior to the decommissioning of an ESS. Decommissioning shall be performed in accordance with the decommissioning plan that includes the following:

1. A narrative description of the activities to be accomplished for removing the ESS from service, and from the facility in which it is located.
2. A listing of any contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event.

**1207.3 Equipment.** ESS equipment shall be in accordance with Sections 1207.3.1 through 1207.3.9.

[W] **1207.3.1 Energy storage system listings.** ESS shall be *listed* in accordance with UL 9540.

**Exceptions:** (~~Lead-acid and nickel-cadmium battery systems installed in facilities under the exclusive control of communications utilities, and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76, are not required to be listed.~~)

1. Lead-acid and nickel-cadmium battery systems less than 50 VAC, 60 VDC in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76.
2. Lead-acid and nickel-cadmium battery systems that are used for VDC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptible power supplies listed and labeled in accordance with UL 1778 and utilized for standby power applications.

**1207.3.2 Equipment listing.** Chargers, inverters and energy storage management systems shall be covered as part of the UL 9540 listing or shall be *listed* separately.

**1207.3.3 Utility interactive systems.** Inverters shall be *listed* and *labeled* in accordance with UL 1741. Only inverters *listed* and *labeled* for utility interactive system use and identified as interactive shall be allowed to operate in parallel with the electric utility power system to supply power to common loads.

**1207.3.4 Energy storage management system.** Where required by the ESS listing, an *approved* energy storage management system that monitors and balances cell voltages, currents and temperatures within the manufacturer's specifications shall be provided. The system shall disconnect electrical connections to the ESS or otherwise place it in a safe condition if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected.

**1207.3.5 Enclosures.** Enclosures of ESS shall be of noncombustible construction.

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**1207.3.6 Repairs.** Repairs of ESS shall only be done by qualified personnel. Repairs with other than identical parts shall be considered retrofitting and comply with Section 1207.3.7. Repairs shall be documented in the service records log.

**1207.3.7 Retrofits.** Retrofitting of an existing ESS shall comply with the following:

1. A construction permit shall be obtained in accordance with Section 105.6.5.
2. New batteries, battery modules, capacitors and similar ESS components shall be *listed*.
3. Battery management and other monitoring systems shall be connected and installed in accordance with the manufacturer's instructions.
4. The overall installation shall continue to comply with UL 9540 listing requirements, where applicable.
5. Systems that have been retrofitted shall be commissioned in accordance with Section 1207.2.1.
6. Retrofits shall be documented in the service records log.

**[W] 1207.3.7.1 Retrofitting lead acid and nickel cadmium.** ~~((Section 1207.3.7 shall not apply to))~~ Changing out or retrofitting of lead-acid and nickel-cadmium batteries in the following applications shall be considered repairs where there is no increase in system size or energy capacity greater than 10 percent of the original design.

1. ~~((with other lead acid and nickel cadmium batteries at))~~ At facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.
2. Battery systems designed in accordance with IEEE C2, used for VDC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Batteries in uninterruptible power supplies listed and labeled in accordance with UL 1778 and used for standby applications only.

**1207.3.8 Replacements.** Replacements of ESS shall be considered new ESS installations and shall comply with the provisions of Section 1207 as applicable to new ESS. The ESS being replaced shall be decommissioned in accordance with Section 1207.2.3.

**1207.3.9 Reused and repurposed equipment.** Equipment and materials shall only be reused or reinstalled as permitted in Section 104.8.1. Storage batteries previously used in other applications, such as electric vehicle propulsion, shall not be reused in applications regulated by Chapter 12 unless *approved* by the *fire code official* and unless the equipment is refurbished by a battery refurbishing company *approved* in accordance with UL 1974.

**1207.4 General installations requirements.** Stationary and mobile ESS shall comply with the requirements of Sections 1207.4.1 through 1207.4.12.

**1207.4.1 Electrical disconnects.** Where the ESS disconnecting means is not within sight of the main electrical service disconnecting means, placards or directories shall be installed at the location of the main electrical service disconnecting means indicating the location of stationary storage battery system disconnecting means in accordance with NFPA 70.

**Exception:** Electrical disconnects for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC shall be permitted to have electrical disconnects signage in accordance with NFPA 76.

**1207.4.2 Working clearances.** Access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment in accordance with NFPA 70 and the manufacturer's instructions.

**1207.4.3 Fire-resistance-rated separations.** Rooms and other indoor areas containing ESS shall be separated from other areas of the building in accordance with Section 1207.7.4. ESS shall be permitted to be in the same room with the equipment they support.

**1207.4.4 Seismic and structural design.** Stationary ESS shall comply with the seismic design requirements in Chapter 16 of the *International Building Code*, and shall not exceed the floor loading limitation of the building.

**1207.4.5 Vehicle impact protection.** Where ESS are subject to impact by a motor vehicle, including fork lifts, vehicle impact protection shall be provided in accordance with Section 312.

**1207.4.6 Combustible storage.** Combustible materials shall not be stored in ESS rooms, areas or walk-in units. Combustible materials in occupied work centers covered by Section 1207.4.10 shall be stored at least 3 feet (914 mm) from ESS cabinets.

**1207.4.7 Toxic and highly toxic gases.** ESS that have the potential to release toxic and highly toxic gas during charging, discharging and normal use conditions shall be provided with a hazardous exhaust system in accordance with Section 502.8 of the *International Mechanical Code*.



**[S] 1207.4.8 Signage.** *Approved* signs shall be provided on or adjacent to all entry doors for ESS rooms or areas and on enclosures of ESS cabinets and walk-in units located outdoors, on rooftops or in open parking garages. Signs designed to meet both the requirements of this section and NFPA 70 shall be permitted. The signage shall include the following or equivalent:

1. “ENERGY STORAGE SYSTEM,” “BATTERY STORAGE SYSTEM,” “CAPACITOR ENERGY STORAGE SYSTEM” or the equivalent.
2. The identification of the electrochemical ESS technology present.
3. “ENERGIZED ELECTRICAL CIRCUITS.”
4. Where water-reactive electrochemical ESS are present, the signage shall include “APPLY NO WATER.”
5. Current contact information, including phone number, for personnel authorized to service the equipment and for fire mitigation personnel required by Section ((1207.1.6.1)) 1207.1.8.1.

**Exception:** Existing electrochemical ESS shall be permitted to include the signage required at the time they were installed.

**1207.4.9 Security of installations.** Rooms, areas and walk-in units in which electrochemical ESS are located shall be secured against unauthorized entry and safeguarded in an *approved* manner. Security barriers, fences, landscaping and other enclosures shall not inhibit the required air flow to or exhaust from the electrochemical ESS and its components.

**1207.4.10 Occupied work centers.** Electrochemical ESS located in rooms or areas occupied by personnel not directly involved with maintenance, service and testing of the systems shall comply with the following:

1. Electrochemical ESS located in occupied work centers shall be housed in locked noncombustible cabinets or other enclosures to prevent access by unauthorized personnel.
2. Where electrochemical ESS are contained in cabinets in occupied work centers, the cabinets shall be located within 10 feet (3048 mm) of the equipment that they support.
3. Cabinets shall include signage complying with Section 1207.4.8.

**1207.4.11 Open rack installations.** Where electrochemical ESS are installed in a separate equipment room and only authorized personnel have access to the room, they shall be permitted to be installed on an open rack for ease of maintenance.

**1207.4.12 Walk-in units.** Walk-in units shall be entered only for inspection, maintenance and repair of ESS units and ancillary equipment, and shall not be occupied for other purposes.

**1207.5 Electrochemical ESS protection.** The protection of electrochemical ESS shall be in accordance with Sections 1207.5.1 through 1207.5.8 where required by Sections 1207.7 through 1207.10.

**[W] TABLE 1207.5  
MAXIMUM ALLOWABLE QUANTITIES OF ELECTROCHEMICAL ESS**

TECHNOLOGY	MAXIMUM ALLOWABLE QUANTITIES <sup>a</sup>
<b>STORAGE BATTERIES</b>	
Flow batteries <sup>b</sup>	600 kWh
Lead-acid, all types	Unlimited
Lithium-ion	600 kWh
<u>Sodium nickel chloride</u>	<u>600 kWh</u>
<del>((Nickel metal hydride (Ni-MH))</del>	<del>((Unlimited))</del>
Nickel-cadmium (Ni-Cd), <u>nickel metal hydride (Ni-MH) and</u> <u>nickel zinc (Ni-Zn)</u>	Unlimited
<u>Zinc manganese dioxide</u> <u>(Zn-MnO<sub>2</sub>)</u>	<u>Unlimited</u>
Other battery technologies	200 kWh
<b>CAPACITORS</b>	
All types	20 kWh
<b>OTHER ELECTROCHEMICAL ESS</b>	
All types	20 kWh

For SI: 1 kilowatt hour = 3.6 megajoules.

a. For electrochemical ESS units rated in amp-hours, kWh shall equal rated voltage times the amp-hour rating divided by 1,000.

b. Shall include vanadium, zinc-bromine, polysulfide-bromide and other flowing electrolyte-type technologies.

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**[W] 1207.5.1 Size and separation.** Electrochemical ESS shall be segregated into groups not exceeding 50 kWh (180 megajoules). Each group shall be separated a minimum of 3 feet (914 mm) from other groups and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

### Exceptions:

1. Lead-acid and nickel-cadmium battery systems in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.
2. Lead-acid and nickel cadmium systems that are used for VDC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies and labeled in accordance with UL 1778, utilized for standby power applications, and limited to not more than 10 percent of the floor area on the floor on which the ESS is located.
- ((2)) 4. The *fire code official* is authorized to approve larger capacities or smaller separation distances based on large-scale fire testing complying with Section ((1207.1.5)) 1207.1.7.

**[S] 1207.5.2 Maximum allowable quantities.** *Fire areas* within rooms, areas and walk-in units containing electrochemical ESS shall not exceed the maximum allowable quantities in Table 1207.5.

### Exceptions:

1. Where *approved* by the *fire code official*, rooms, areas and walk-in units containing electrochemical ESS that exceed the amounts in Table 1207.5 shall be permitted based on a hazardous mitigation analysis in accordance with Section ((1207.1.4)) 1207.1.6 and large-scale fire testing complying with Section ((1207.1.5)) 1207.1.7.
2. Lead-acid and nickel-cadmium battery systems installed in facilities under the exclusive control of communications utilities, and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.
3. Dedicated-use buildings in compliance with Section 1207.7.1.

**1207.5.2.1 Mixed electrochemical energy systems.** Where rooms, areas and walk-in units contain different types of electrochemical energy technologies, the total aggregate quantities of the systems shall be determined based on the sum of percentages of each technology-type quantity divided by the maximum allowable quantity of each technology type. The sum of the percentages shall not exceed 100 percent of the maximum allowable quantity.

**[W] 1207.5.3 Elevation.** Electrochemical ESS shall not be located in the following areas:

1. Where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.
2. Where the floor is located below the lowest *level of exit discharge*.

### Exceptions:

1. Lead-acid and nickel-cadmium battery systems less than 50 VAC and 60 VDC installed in facilities under the exclusive control of communications utilities in accordance with NFPA 76.
2. Lead-acid and nickel cadmium systems that are used for VDC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies and labeled in accordance with UL 1778, utilized for standby power applications, and limited to not more than 10 percent of the floor area on the floor on which the ESS is located.
- ((2)) 4. Where *approved*, installations shall be permitted in underground vaults complying with NFPA 70, Article 450, Part III.
- ((3)) 5. Where *approved* by the *fire code official*, installations shall be permitted on higher and lower floors.

**[W] 1207.5.4 Fire detection.** An *approved* automatic smoke detection system or radiant energy-sensing fire detection system complying with Section 907.2 shall be installed in rooms, indoor areas and walk-in units containing electrochemical ESS. An *approved* radiant energy-sensing fire detection system shall be installed to protect open parking garage and rooftop installations. Alarm signals from detection systems shall be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or where *approved* to a constantly attended location.

**Exception:** Normally unoccupied, remote stand-alone telecommunications structures with a gross floor area of less than 1500 ft<sup>2</sup> (139 m<sup>2</sup>) utilizing lead-acid or nickel cadmium batteries shall not be required to have a fire detection system installed.

**[W] 1207.5.4.1 System status.** (~~Where required by the *fire code official*, visible annunciation shall be provided on cabinet exteriors or in other *approved* locations to indicate that potentially hazardous conditions associated with the ESS exist.~~) Lead-acid and nickel-cadmium battery systems that are used for VDC power for control of substations and

control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations shall be allowed to use the process control system to monitor the smoke or radiant energy-sensing fire detectors required in Section 1207.5.4.

**[W][S] 1207.5.5 Fire suppression systems.** Rooms and areas within buildings and walk-in units containing electrochemical ESS shall be protected by an automatic fire suppression system designed and installed in accordance with one of the following:

1. ~~((An automatic))~~ Automatic sprinkler systems, designed and installed in accordance with Section 903.3.1.1 for ESS units (groups) with a maximum stored energy capacity of 50 kWh, as described in Section 1207.5.1, shall be designed with a minimum density of 0.3 gpm/ft<sup>2</sup> (1.14 L/min) based ~~((on the fire area))~~ over the area of the room or 2,500 square-foot (232 m<sup>2</sup>) design area, whichever is smaller, unless a lower density is approved based upon large-scale fire testing in accordance with Section 1207.1.7.
2. ~~((Where approved, an automatic))~~ Automatic sprinkler systems designed and installed in accordance with Section 903.3.1.1 ~~((with a sprinkler hazard classification))~~ for ESS units (groups) exceeding 50 kWh shall use a density based on large-scale fire testing complying with Section ~~((1207.1.5))~~ 1207.1.7.
3. The following alternative automatic fire-extinguishing systems designed and installed in accordance with Section 904, provided that the installation is *approved* by the *fire code official* based on large-scale fire testing complying with Section ~~((1207.1.5))~~ 1207.1.7:
  - 3.1. NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems.*
  - 3.2. NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection.*
  - 3.3. NFPA 750, *Standard on Water Mist Fire Protection Systems.*
  - 3.4. NFPA 2001, *Standard on Clean Agent Fire-Extinguishing Systems.*
  - 3.5. NFPA 2010, *Standard for Fixed Aerosol Fire-Extinguishing Systems.*

**Exceptions:**

1. Fire suppression systems for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.
2. Lead-acid and nickel cadmium systems that are used for VDC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations shall not be required to have a fire suppression system installed.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10 percent of the floor area on the floor on which the ESS is located shall not be required to have a fire suppression system.

**1207.5.5.1 Water-reactive systems.** Electrochemical ESS that utilize water-reactive materials shall be protected by an *approved* alternative automatic fire-extinguishing system in accordance with Section 904, where the installation is *approved* by the *fire code official* based on large-scale fire testing complying with Section ~~((1207.1.5))~~ 1207.1.7.

**1207.5.6 Maximum enclosure size.** Outdoor walk-in units housing ESS shall not exceed 53 feet by 8 feet by 9.5 feet high (16 154 mm × 2438 mm × 2896 mm), not including bolt-on HVAC and related equipment, as *approved*. Outdoor walk-in units exceeding these limitations shall be considered indoor installations and comply with the requirements in Section 1207.7.

**1207.5.7 Vegetation control.** Areas within 10 feet (3048 mm) on each side of outdoor ESS shall be cleared of combustible vegetation and other combustible growth. Single specimens of trees, shrubbery or cultivated ground cover such as green grass, ivy, succulents or similar plants used as ground cover shall be permitted to be exempt provided that they do not form a means of readily transmitting fire.

**1207.5.8 Means of egress separation.** ESS located outdoors and in open parking garages shall be separated from any *means of egress* as required by the *fire code official* to ensure safe egress under fire conditions, but in no case less than 10 feet (3048 mm).

**Exception:** The *fire code official* is authorized to approve a reduced separation distance if large-scale fire testing complying with Section ~~((1207.1.5))~~ 1207.1.7 is provided that shows that a fire involving the ESS will not adversely impact occupant egress.

**1207.6 Electrochemical ESS technology-specific protection.** Electrochemical ESS installations shall comply with the requirements of this section in accordance with the applicable requirements of Table 1207.6.

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[W] TABLE 1207.6  
ELECTROCHEMICAL ESS TECHNOLOGY-SPECIFIC REQUIREMENTS

COMPLIANCE REQUIRED <sup>b</sup>		BATTERY TECHNOLOGY						OTHER ESS AND BATTERY TECHNOLOGIES <sup>b</sup>	CAPACITOR ESS <sup>b</sup>
Feature	Section	Lead-acid	Nickel cadmium (Ni-Cd), (and) nickel metal hydride (Ni-MH) and nickel zinc (Ni-Zn)	Zinc manganese dioxide (ZnMnO <sub>2</sub> )	Lithium-ion	Flow	Sodium nickel chloride		
Exhaust ventilation	1207.6.1	Yes	Yes	Yes	No	Yes	No	Yes	Yes
Explosion control	1207.6.3	Yes <sup>a</sup>	Yes <sup>a</sup>	Yes	Yes	No	Yes	Yes	Yes
Safety caps	1207.6.4	Yes	Yes	No	No	No	No	Yes	Yes
Spill control and neutralization	1207.6.2	Yes <sup>c</sup>	Yes <sup>c</sup>	Yes <sup>f</sup>	No	Yes	No	Yes	Yes
Thermal runaway	1207.6.5	Yes <sup>d</sup>	Yes <sup>d</sup>	Yes <sup>e</sup>	Yes <sup>c</sup>	No	Yes	Yes <sup>c</sup>	Yes

- a. Not required for lead-acid and nickel-cadmium batteries at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.
- b. Protection shall be provided unless documentation acceptable to the *fire code official* is provided in accordance with Section 104.8.2 that provides justification why the protection is not necessary based on the technology used.
- c. Applicable to vented-type (i.e., flooded) nickel-cadmium and lead-acid batteries.
- d. Not required for vented-type (i.e., flooded) (~~lead-acid~~) batteries.
- e. The thermal runaway protection is permitted to be part of a battery management system that has been evaluated with the battery as part of the evaluation to UL 1973.
- f. Not required for batteries with jelled electrolyte.

**1207.6.1 Exhaust ventilation.** Where required by Table 1207.6 or elsewhere in this code, exhaust ventilation of rooms, areas and walk-in units containing electrochemical ESS shall be provided in accordance with the *International Mechanical Code* and Section 1207.6.1.1 or 1207.6.1.2.

**1207.6.1.1 Ventilation based on LFL.** The exhaust ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammable limit (LFL) of the total volume of the room, area or walk-in unit during the worst-case event of simultaneous charging of batteries at the maximum charge rate, in accordance with nationally recognized standards.

**1207.6.1.2 Ventilation based on exhaust rate.** Mechanical exhaust ventilation shall be provided at a rate of not less than 1 ft<sup>3</sup>/min/ft<sup>2</sup> (5.1 L/sec/m<sup>2</sup>) of floor area of the room, area or walk-in unit. The ventilation shall be either continuous or shall be activated by a gas detection system in accordance with Section 1207.6.1.2.4.

**1207.6.1.2.1 Standby power.** Mechanical exhaust ventilation shall be provided with a minimum of 2 hours of standby power in accordance with Section 1203.2.5.

**1207.6.1.2.2 Installation instructions.** Required mechanical exhaust ventilation systems shall be installed in accordance with the manufacturer’s installation instructions and the *International Mechanical Code*.

**1207.6.1.2.3 Supervision.** Required mechanical exhaust ventilation systems shall be supervised by an *approved* central station, proprietary or remote station service in accordance with NFPA 72, or shall initiate an audible and visible signal at an *approved* constantly attended on-site location.

**1207.6.1.2.4 Gas detection system.** Where required by Section 1207.6.1.2, rooms, areas and walk-in units containing ESS shall be protected by an *approved* continuous gas detection system that complies with Section 916 and with the following:

1. The gas detection system shall be designed to activate the mechanical ventilation system when the level of flammable gas in the room, area or walk-in unit exceeds 25 percent of the LFL.
2. The mechanical ventilation system shall remain on until the flammable gas detected is less than 25 percent of the LFL.
3. The gas detection system shall be provided with a minimum of 2 hours of standby power in accordance with Section 1203.2.5.
4. Failure of the gas detection system shall annunciate a trouble signal at an *approved* central station, proprietary or remote station service in accordance with NFPA 72, or shall initiate an audible and visible trouble signal at an *approved* constantly attended on-site location.

**1207.6.2 Spill control and neutralization.** Where required by Table 1207.6 or elsewhere in this code, areas containing free-flowing liquid electrolyte or hazardous materials shall be provided with spill control and neutralization in accordance with this section.

**1207.6.2.1 Spill control.** Spill control shall be provided to prevent the flow of liquid electrolyte or hazardous materials to adjoining rooms or areas. The method shall be capable of containing a spill from the single largest battery or vessel.

**1207.6.2.2 Neutralization.** An *approved* method that is capable of neutralizing spilled liquid electrolyte from the largest battery or vessel to a pH between 5.0 and 9.0 shall be provided.

**1207.6.2.3 Communications utilities.** The requirements of Section 1207.6.2 shall apply only when the aggregate capacity of multiple vessels exceeds 1,000 gallons (3785 L) for lead-acid and nickel-cadmium battery systems operating at less than 50 VAC and 60 VDC that are located at facilities under the exclusive control of communications utilities, and those facilities comply with NFPA 76 in addition to applicable requirements of this code.

**[W][S] 1207.6.3 Explosion control.** Where required by Table 1207.6 or elsewhere in this code, explosion control complying with Section 911 shall be provided for rooms, areas, ESS cabinets or ESS walk-in units containing electrochemical ESS technologies.

**Exceptions:**

1. Where *approved*, explosion control is permitted to be waived by the *fire code official* based on large-scale fire testing complying with Section ~~((1207.1.5))~~ 1207.1.7 that demonstrates that flammable gases are not liberated from electrochemical ESS cells or modules, ~~((where tested in accordance with UL 9540A-))~~
2. Where *approved*, explosion control is permitted to be waived by the *fire code official* based on documentation provided in accordance with Section 104.8 that demonstrates that the electrochemical ESS technology to be used does not have the potential to release flammable gas concentrations in excess of 25 percent of the LFL anywhere in the room, area, walk-in unit or structure under thermal runaway or other fault conditions.
3. Where *approved*, ESS cabinets that have no debris, shrapnel, or enclosure pieces ejected during large-scale fire testing complying with Section 1207.1.7 shall be permitted in lieu of providing explosion control complying with Section 911.
4. Explosion control is not required for lead-acid and nickel cadmium battery systems less than 50 VAC, 60 VDC in telecommunication facilities under the exclusive control of communications utilities located in building spaces or walk-in units used exclusively for such installations.
5. Explosion control is not required for lead-acid and nickel cadmium systems used for VDC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility located in building spaces or walk-in units used exclusively for such installations.
6. Explosion control is not required for lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, and housed in a single cabinet in a single fire area in buildings or walk-in units.

**1207.6.4 Safety caps.** Where required by Table 1207.6 or elsewhere in this code, vented batteries and other ESS shall be provided with flame-arresting safety caps.

**1207.6.5 Thermal runaway.** Where required by Table 1207.6 or elsewhere in this code, batteries and other ESS shall be provided with a *listed* device or other *approved* method to prevent, detect and minimize the impact of thermal runaway.

**1207.7 Indoor installations.** Indoor ESS installations shall be in accordance with Sections 1207.7.1 through 1207.7.4.

**TABLE 1207.7  
INDOOR ESS INSTALLATIONS**

COMPLIANCE REQUIRED		DEDICATED-USE BUILDINGS <sup>a</sup>	NONDEDICATED-USE BUILDINGS <sup>b</sup>
Feature	Section		
Dwelling units and sleeping units	1207.7.3	NA	Yes
Elevation	1207.5.3	Yes	Yes
Fire suppression systems	1207.5.5	Yes <sup>c</sup>	Yes
Fire-resistance-rated separations	1207.7.4	Yes	Yes
General installation requirements	1207.4	Yes	Yes
Maximum allowable quantities	1207.5.2	No	Yes
Size and separation	1207.5.1	Yes	Yes
Smoke and automatic fire detection <sup>c</sup>	1207.5.4	Yes <sup>d</sup>	Yes
Technology specific protection	1207.6	Yes	Yes

NA = Not Allowed.

a. See Section 1207.7.1.

b. See Section 1207.7.2.

c. Where *approved* by the *fire code official*, fire suppression systems are permitted to be omitted in dedicated-use buildings located more than 100 feet (30.5 m) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high-piled stock and other exposure hazards.

**1207.8.2 Installations near exposures.** For the purpose of Table 1207.8, installations near exposures include all outdoor ESS installations that do not comply with Section 1207.8.1 remote outdoor location requirements.

**1207.8.3 Clearance to exposures.** ESS located outdoors shall be separated by a minimum of 10 feet (3048 mm) from the following exposures:

1. Lot lines.
2. Public ways.
3. Buildings.
4. Stored combustible materials.
5. Hazardous materials.
6. High-piled stock.
7. Other exposure hazards.

**Exceptions:**

1. Clearances are permitted to be reduced to 3 feet (914 mm) where a 1-hour free-standing fire barrier suitable for exterior use and extending 5 feet (1524 mm) above and 5 feet (1524 mm) beyond the physical boundary of the ESS installation is provided to protect the exposure.
2. Clearances to buildings are permitted to be reduced to 3 feet (914 mm) where noncombustible exterior walls with no openings or combustible overhangs are provided on the wall adjacent to the ESS and the fire-resistance rating of the exterior wall is a minimum of 2 hours.
3. Clearances to buildings are permitted to be reduced to 3 feet (914 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the ESS, and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large-scale fire testing complying with Section ((~~1207.1.5~~) 1207.1.7).

**1207.8.4 Exterior wall installations.** ESS shall be permitted to be installed outdoors on exterior walls of buildings when all of the following conditions are met:

1. The maximum energy capacity of individual ESS units shall not exceed 20 kWh.
2. The ESS shall comply with applicable requirements in Section 1207.
3. The ESS shall be installed in accordance with the manufacturer’s instructions and their listing.
4. Individual ESS units shall be separated from each other by at least 3 feet (914 mm).
5. The ESS shall be separated from doors, windows, operable openings into buildings or HVAC inlets by at least 5 feet (1524 mm).

**Exception:** Where *approved*, smaller separation distances in Items 4 and 5 shall be permitted based on large-scale fire testing complying with Section ((~~1207.1.5~~) 1207.1.7).

**1207.9 Special installations.** Rooftop and open parking garage ESS installations shall comply with Sections 1207.9.1 through 1207.9.6.

**TABLE 1207.9  
SPECIAL ESS INSTALLATIONS**

COMPLIANCE REQUIRED		ROOFTOPS <sup>a</sup>	OPEN PARKING GARAGES <sup>b</sup>
Feature	Section		
All ESS installations	1207.4	Yes	Yes
Clearance to exposures	1207.9.3	Yes	Yes
Fire suppression systems	1207.9.4	Yes	Yes
Maximum allowable quantities	1207.5.2	Yes	Yes
Maximum enclosure size	1207.5.6	Yes	Yes
Means of egress separation	1207.5.8	Yes	Yes
Open parking garage installations	1207.9.6	No	Yes
Rooftop installations	1207.9.5	Yes	No
Size and separation	1207.5.1	Yes	Yes
Smoke and automatic fire detection	1207.5.4	Yes	Yes
Technology-specific protection	1207.6	Yes	Yes

a. See Section 1207.9.1.

b. See Section 1207.9.2.

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**1207.9.1 Rooftop installations.** For the purpose of Table 1207.9, rooftop ESS installations are those located on the roofs of buildings.

**1207.9.2 Open parking garage installations.** For the purpose of Table 1207.9, open parking garage ESS installations are those located in a structure or portion of a structure that complies with Section 406.5 of the *International Building Code*.

**1207.9.3 Clearance to exposures.** ESS located on rooftops and in open parking garages shall be separated by a minimum of 10 feet (3048 mm) from the following exposures:

1. Buildings, except the building on which rooftop ESS is mounted.
2. Any portion of the building on which a rooftop system is mounted that is elevated above the rooftop on which the system is installed.
3. Lot lines.
4. Public ways.
5. Stored combustible materials.
6. Locations where motor vehicles can be parked.
7. Hazardous materials.
8. Other exposure hazards.

**Exceptions:**

1. Clearances are permitted to be reduced to 3 feet (914 mm) where a 1-hour free-standing fire barrier suitable for exterior use and extending 5 feet (1524 mm) above and 5 feet (1524 mm) beyond the physical boundary of the ESS installation is provided to protect the exposure.
2. Clearances are permitted to be reduced to 3 feet (914 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the ESS, and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large-scale fire testing complying with Section ~~((1207.1.5))~~ 1207.1.7.

**1207.9.4 Fire suppression systems.** ESS located in walk-in units on rooftops or in walk-in units in open parking garages shall be provided with automatic fire suppression systems within the ESS enclosure in accordance with Section 1207.5.5. Areas containing ESS other than walk-in units in open parking structures on levels not open above to the sky shall be provided with an automatic fire suppression system complying with Section 1207.5.5.

**Exception:** A fire suppression system is not required in open parking garages if large-scale fire testing complying with Section ~~((1207.1.5))~~ 1207.1.7 is provided that shows that a fire will not impact the exposures in Section 1207.9.3.

**1207.9.5 Rooftop installations.** ESS and associated equipment that are located on rooftops and not enclosed by building construction shall comply with the following:

1. Stairway access to the roof for emergency response and fire department personnel shall be provided either through a bulkhead from the interior of the building or a stairway on the exterior of the building.
2. Service walkways at least 5 feet (1524 mm) in width shall be provided for service and emergency personnel from the point of access to the roof to the system.
3. ESS and associated equipment shall be located from the edge of the roof a distance equal to at least the height of the system, equipment or component but not less than 5 feet (1524 mm).
4. The roofing materials under and within 5 feet (1524 mm) horizontally from an ESS or associated equipment shall be noncombustible or shall have a Class A rating when tested in accordance with ASTM E108 or UL 790.
5. A Class I standpipe outlet shall be installed at an *approved* location on the roof level of the building or in the stairway bulkhead at the top level.
6. The ESS shall be the minimum of 10 feet (3048 mm) from the fire service access point on the rooftop.

**1207.9.6 Open parking garages.** ESS and associated equipment that are located in open parking garages shall comply with all of the following:

1. ESS shall not be located within 50 feet (15 240 mm) of air inlets for building HVAC systems.

**Exception:** This distance shall be permitted to be reduced to 25 feet (7620 mm) if the automatic fire alarm system monitoring the radiant-energy sensing detectors de-energizes the ventilation system connected to the air intakes upon detection of fire.

2. ESS shall not be located within 25 feet (7620 mm) of *exits* leading from the attached building where located on a covered level of the parking structure not directly open to the sky above.
3. An *approved* fence with a locked gate or other *approved* barrier shall be provided to keep the general public at least 5 feet (1524 mm) from the outer enclosure of the ESS.

**1207.10 Mobile ESS equipment and operations.** Mobile ESS equipment and operations shall comply with Sections 1207.10.1 through 1207.10.7.7.

**TABLE 1207.10  
MOBILE ENERGY STORAGE SYSTEMS (ESS)**

COMPLIANCE REQUIRED		DEPLOYMENT <sup>a</sup>
Feature	Section	
All ESS installations	1207.4	Yes <sup>b</sup>
Fire suppression systems	1207.5.5	Yes <sup>c</sup>
Maximum allowable quantities	1207.5.2	Yes
Maximum enclosure size	1207.5.6	Yes
Means of egress separation	1207.5.8	Yes
Size and separation	1207.5.1	Yes <sup>d</sup>
Smoke and automatic fire detection	1207.5.4	Yes <sup>e</sup>
Technology-specific protection	1207.6	Yes
Vegetation control	1207.5.7	Yes

- a. See Section 1207.10.2.
- b. Mobile operations on wheeled vehicles and trailers shall not be required to comply with Section 1207.4.4 seismic and structural load requirements.
- c. Fire suppression system connections to the water supply shall be permitted to use *approved* temporary connections.
- d. In walk-in units, spacing is not required between ESS units and the walls of the enclosure.
- e. Alarm signals are not required to be transmitted to an *approved* location for mobile ESS deployed 30 days or less.

**[W] 1207.10.1 Charging and storage.** For the purpose of Section 1207.10, charging and storage covers the operation where mobile ESS are charged and stored so they are ready for deployment to another site, and where they are charged and stored after a deployment.

**Exception:** Mobile ESS used to temporarily provide power to lead-acid and nickel cadmium systems that are designed in accordance with IEEE C2, used for VDC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.

**[W] 1207.10.2 Deployment.** For the purpose of Section 1207.10, deployment covers operations where mobile ESS are located at a site other than the charging and storage site and are being used to provide power.

**Exception:** Mobile ESS used to temporarily provide power to lead-acid and nickel cadmium systems that are used for VDC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.

**[S] 1207.10.3 Permits.** (~~Construction~~) Installation and operational permits shall be provided for charging and storage of mobile ESS and operational permits shall be provided for deployment of mobile ESS as required by Section (~~1207.1.2~~) 1207.1.4.

**1207.10.4 Construction documents.** *Construction documents* complying with Section (~~1207.1.3~~) 1207.1.5 shall be provided with the construction permit application for mobile ESS charging and storage locations.

**1207.10.4.1 Deployment documents.** The following information shall be provided with the operation permit applications for mobile ESS deployments:

1. Relevant information for the mobile ESS equipment and protection measures in the *construction documents* required by Section (~~1207.1.3~~) 1207.1.5.
2. Location and layout diagram of the area in which the mobile ESS is to be deployed, including a scale diagram of all nearby exposures.
3. Location and content of signage, including no smoking signs.
4. Description of fencing to be provided around the ESS, including locking methods.
5. Details on fire suppression, smoke and automatic fire detection, system monitoring, thermal management, exhaust ventilation and explosion control, if provided.
6. For deployment, the intended duration of operation, including anticipated connection and disconnection times and dates.
7. Location and description of local staging stops during transit to the deployment site. See Section 1207.10.7.5.
8. Description of the temporary wiring, including connection methods, conductor type and size, and circuit overcurrent protection to be provided.



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9. Description of how fire suppression system connections to water supplies or extinguishing agents are to be provided.
10. Contact information for personnel who are responsible for maintaining and servicing the equipment, and responding to emergencies as required by Section ~~((1207.1.6.4))~~ 1207.1.8.1.

**1207.10.5 Approved locations.** Locations where mobile ESS are charged, stored and deployed shall be restricted to the locations established on the construction and operational permits.

**1207.10.6 Charging and storage.** Installations where mobile ESS are charged and stored shall be treated as permanent ESS indoor or outdoor installations, and shall comply with the following sections, as applicable:

1. Indoor charging and storage shall comply with Section 1207.7.
2. Outdoor charging and storage shall comply with Section 1207.8.
3. Charging and storage on rooftops and in open parking garages shall comply with Section 1207.9.

**Exceptions:**

1. Electrical connections shall be permitted to be made using temporary wiring complying with the manufacturer's instructions, the UL 9540 listing and NFPA 70.
2. Fire suppression system connections to the water supply shall be permitted to use *approved* temporary connections.

**1207.10.7 Deployed mobile ESS requirements.** Deployed mobile ESS equipment and operations shall comply with this section and Table 1207.10.

**1207.10.7.1 Duration.** The duration of mobile ESS deployment shall not exceed 30 days.

**Exceptions:**

1. Mobile ESS deployments that provide power for durations longer than 30 days shall comply with Section 1207.10.6.
2. Mobile ESS deployments shall not exceed 180 days unless additional operational permits are obtained.

**1207.10.7.2 Restricted locations.** Deployed mobile ESS operations shall not be located indoors, in covered parking garages, on rooftops, below grade or under building overhangs.

**1207.10.7.3 Clearance to exposures.** Deployed mobile ESS shall be separated by a minimum of 10 feet (3048 mm) from the following exposures:

1. Public ways.
2. Buildings.
3. Stored combustible materials.
4. Hazardous materials.
5. High-piled storage.
6. Other exposure hazards.

Deployed mobile ESS shall be separated by a minimum of 50 feet (15 240 mm) from public seating areas and from tents, canopies and membrane structures with an *occupant load* of 30 or more.

**1207.10.7.4 Electrical connections.** Electrical connections shall be made in accordance with the manufacturer's instructions and the UL 9540 listing. Temporary wiring for electrical power connections shall comply with NFPA 70. Fixed electrical wiring shall not be provided.

**1207.10.7.5 Local staging.** Mobile ESS in transit from the charging and storage location to the deployment location and back shall not be parked within 100 feet (30 480 mm) of an occupied building for more than 1 hour during transit, unless specifically *approved* by the *fire code official* when the permit is issued.

**1207.10.7.6 Fencing.** An *approved* fence with a locked gate or other *approved* barrier shall be provided to keep the general public at least 5 feet (1524 mm) from the outer enclosure of a deployed mobile ESS.

**1207.10.7.7 Smoking.** Smoking shall be prohibited within 10 feet (3048 mm) of mobile ESS. Signs shall be posted in accordance with Section 310.

**[W][S] 1207.11 ESS in Group R-3 and R-4 occupancies.** ESS in Group R-3 and R-4 occupancies shall be ~~((installed and maintained))~~ in accordance with Sections 1207.11.1 through 1207.11.9. ~~((The temporary use of an owner or occupant's electric powered vehicle as an ESS shall be in accordance with Section 1207.11.10.))~~

**Exceptions:**

1. ESS listed and labeled in accordance with UL 9540 and marked “For use in residential dwelling units,” where installed in accordance with the manufacturer’s instructions and NFPA 70.
2. ESS rated less than 1 kWh (3.6 megajoules).

**[W] 1207.11.1 Equipment listings.** ESS shall be *listed* and *labeled* in accordance with UL 9540. ~~((ESS listed and labeled solely for utility or commercial use shall not be used for residential applications.~~

**Exceptions:**

1. ~~Where approved, repurposed unlisted battery systems from electric vehicles are allowed to be installed outdoors or in detached dedicated cabinets located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways.~~
2. ~~ESS less than 1 kWh (3.6 megajoules:))~~

**1207.11.2 Installation.** ESS shall be installed in accordance with the manufacturer’s instructions and their listing.

**[W][S] 1207.11.2.1 Spacing.** Individual ESS units shall be separated from each other by at least 3 feet (914 mm) ~~((of spacing unless))~~ except where smaller separation distances are documented to be adequate based on large-scale fire testing complying with Section ((1207.1.5)) 1207.1.7.

**[W] 1207.11.3 Location.** ESS shall be installed only in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the *dwelling unit* living space and *sleeping units* in accordance with Section 406.3.2 of the *International Building Code*.
3. Outdoors or on the exterior side of exterior walls located a minimum of 3 feet (914 mm) from doors and windows directly entering the dwelling unit.
4. ~~((Utility))~~ Enclosed utility closets, basements, ((and)) storage or utility spaces within *dwelling units* and *sleeping units* with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than 5/8-inch (16 mm) Type X gypsum wallboard.

ESS shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.

**[W] 1207.11.4 Energy ratings.** Individual ESS units shall have a maximum rating of 20 kWh. The aggregate rating ~~((structure))~~ of the ESS shall not exceed:

1. 40 kWh within utility closets, basements, and storage or utility spaces.
2. 80 kWh in attached or detached garages and detached accessory structures.
3. 80 kWh on exterior walls.
4. 80 kWh outdoors on the ground.

ESS installations exceeding the permitted individual or aggregate ratings shall be installed in accordance with Section 1207.1 through 1207.9.

**1207.11.5 Electrical installation.** ESS shall be installed in accordance with NFPA 70. Inverters shall be *listed* and *labeled* in accordance with UL 1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid shall use inverters *listed* for utility interaction.

**[W] 1207.11.6 Fire detection.** ESS installed in group R-3 and R-4 occupancies shall comply with the following:

1. Rooms and areas within *dwelling units*, *sleeping units*, basements and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with Section 907.2.11.
2. A ~~((heat detector listed and interconnected to the smoke alarms))~~ listed heat alarm shall be installed in locations ~~((within dwelling units, sleeping units and attached garages))~~ where smoke alarms cannot be installed based on their listing.

**[W][S] 1207.11.7 Protection from impact.** ~~((Stationary storage battery systems))~~ ESS installed in a location subject to vehicle damage shall be protected by *approved* barriers. ~~((Appliances in garages shall also be installed in accordance with Section 304.3 of the International Mechanical Code.))~~

**[S] 1207.11.8 Ventilation.** Indoor installations of ESS that include batteries that produce hydrogen or other flammable gases during charging shall be provided with exhaust ventilation in accordance with Section ~~((1207.6.4))~~ 304.5 of the International Mechanical Code.

**[W] ~~((1207.11.9 Toxic and highly toxic gas.~~** ~~ESS that have the potential to release toxic or highly toxic gas during charging, discharging and normal use conditions shall not be installed within Group R-3 or R-4 occupancies.))~~

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**[W][S] (~~1207.11.10~~) 1207.11.9 Electric vehicle use.** The temporary use of an *owner* or occupant's electric-powered vehicle to power a *dwelling unit* or *sleeping unit* while parked in an attached or detached garage or (~~outside~~) outdoors shall comply with the vehicle manufacturer's instructions and NFPA 70.

## AVIATION FACILITIES

### SECTION 2004 AIRCRAFT MAINTENANCE

**2004.1 Transferring flammable and combustible liquids.** *Flammable* and *combustible liquids* shall not be dispensed into or removed from a container, tank, vehicle or aircraft except in *approved* locations.

**2004.2 Application of flammable and combustible liquid finishes.** The application of *flammable* or Class II *combustible liquid* finishes is prohibited unless both of the following conditions are met:

1. The application of the liquid finish is accomplished in an *approved* location.
2. The application methods and procedures are in accordance with Chapter 24.

**2004.3 Cleaning parts.** Class IA *flammable liquids* shall not be used to clean aircraft, aircraft parts or aircraft engines. Cleaning with other *flammable* and *combustible liquids* shall be in accordance with Section 5705.3.6.

**2004.4 Spills.** Sections 2004.4.1 through 2004.4.3 shall apply to spills of *flammable* and *combustible liquids* and other hazardous materials. Fuel spill control shall also comply with Section 2006.11.

**2004.4.1 Cessation of work.** Activities in the affected area not related to the mitigation of the spill shall cease until the spilled material has been removed or the hazard has been mitigated.

**2004.4.2 Vehicle movement.** Aircraft or other vehicles shall not be moved through the spill area until the spilled material has been removed or the hazard has been mitigated.

**2004.4.3 Mitigation.** Spills shall be reported, documented and mitigated in accordance with the provisions of this chapter and Section 5003.3.

**2004.5 Running engines.** Aircraft engines shall not be run in aircraft hangars except in *approved* engine test areas.

**2004.6 Open flame.** Repairing of aircraft requiring the use of open flames, spark-producing devices or the heating of parts above 500°F (260°C) shall only be done outdoors or in an area complying with the provisions of the ((*International*)) *Seattle Building Code* for a Group F-1 occupancy.

**2004.7 Other aircraft maintenance.** Maintenance, repairs, modifications, or construction performed on aircraft not addressed elsewhere in this code shall be conducted in accordance with NFPA 410.

### SECTION 2005 PORTABLE FIRE EXTINGUISHERS

**2005.1 General.** Portable fire extinguishers suitable for *flammable* or *combustible liquid* and electrical-type fires shall be provided as specified in Sections 2005.2 through 2005.6 and Section 906. Extinguishers required by this section shall be inspected and maintained in accordance with Section 906.

**2005.2 On towing vehicles.** Vehicles used for towing aircraft shall be equipped with not less than one *listed* portable fire extinguisher complying with Section 906 and having a minimum rating of 20-B:C.

**2005.3 On welding apparatus.** Welding apparatus shall be equipped with not less than one *listed* portable fire extinguisher complying with Section 906 and having a minimum rating of 2-A:20-B:C.

**2005.4 On aircraft fuel-servicing tank vehicles.** Aircraft fuel-servicing tank vehicles shall be equipped with not less than two *listed* portable fire extinguishers complying with Section 906, each having a minimum rating of 20-B:C. A portable fire extinguisher shall be provided with *ready access* from either side of the vehicle.

**2005.5 On hydrant fuel-servicing vehicles.** Hydrant fuel-servicing vehicles shall be equipped with not less than one *listed* portable fire extinguisher complying with Section 906 and having a minimum rating of 20-B:C.

**2005.6 At fuel-dispensing stations.** Portable fire extinguishers at fuel-dispensing stations shall be located such that pumps or dispensers are not more than 75 feet (22 860 mm) from one such extinguisher. Fire extinguishers shall be provided as follows:

1. Where the open-hose discharge capacity of the fueling system is not more than 200 gallons per minute (13 L/s), not less than two *listed* portable fire extinguishers complying with Section 906 and having a minimum rating of 20-B:C shall be provided.
2. Where the open-hose discharge capacity of the fueling system is more than 200 gallons per minute (13 L/s) but not more than 350 gallons per minute (22 L/s), not less than one *listed* wheeled extinguisher complying with Section 906 and having a minimum extinguishing rating of 80-B:C, and a minimum agent capacity of 125 pounds (57 kg), shall be provided.
3. Where the open-hose discharge capacity of the fueling system is more than 350 gallons per minute (22 L/s), not less than two *listed* wheeled extinguishers complying with Section 906 and having a minimum rating of 80-B:C each, and a minimum capacity agent of 125 pounds (57 kg) each, shall be provided.

**2006.19.3 Repairing hose.** Hoses are allowed to be repaired by removing the damaged portion and recoupling the undamaged end. When recoupling hoses, only couplings designed and *approved* for the size and type of hose in question shall be used. Hoses repaired in this manner shall be visually inspected and hydrostatically tested prior to being placed back in service.

**2006.19.4 New hose.** New hose shall be visually inspected prior to being placed into service.

**2006.20 Aircraft fuel-servicing vehicles parking.** Unattended aircraft fuel-servicing vehicles shall be parked in areas that provide for both the unencumbered dispersal of vehicles in the event of an emergency and the control of leakage such that adjacent buildings and storm drains are not contaminated by leaking fuel.

**2006.20.1 Parking area design.** Parking areas for tank vehicles shall be designed and utilized such that a clearance of 10 feet (3048 mm) is maintained between each parked vehicle for fire department access. In addition, a minimum clearance of 50 feet (15 240 mm) shall be maintained between tank vehicles and parked aircraft and structures other than those used for the maintenance or garaging of aircraft fuel-servicing vehicles.

**2006.21 Radar equipment.** Aircraft fuel-servicing operations shall be prohibited while the weather-mapping radar of that aircraft is operating.

Aircraft fuel-servicing or other operations in which *flammable liquids*, vapors or mists could be present shall not be conducted within 300 feet (91 440 mm) of an operating aircraft surveillance radar.

Aircraft fuel-servicing operations shall not be conducted within 300 feet (91 440 mm) of airport flight traffic surveillance radar equipment.

Aircraft fuel-servicing or other operations in which *flammable liquids*, vapors or mists could be present shall not be conducted within 100 feet (30 480 mm) of airport ground traffic surveillance radar equipment.

**2006.21.1 Direction of radar beams.** The beam from ground radar equipment shall not be directed toward fuel storage or loading racks.

**Exceptions:**

1. Fuel storage and loading racks in excess of 300 feet (91 440 mm) from airport flight traffic surveillance equipment.
2. Fuel storage and loading racks in excess of 100 feet (30 480 mm) from airport ground traffic surveillance equipment.

## **SECTION 2007 HELISTOPS AND HELIPORTS**

**[S] 2007.1 General.** Helistops and heliports shall be maintained in accordance with Sections 2007.2 through 2007.8. Helistops and heliports on buildings shall comply with NFPA 418 and be constructed in accordance with the *International Building Code*.

**[S] 2007.2 Clearances.** The landing area for helicopters less than 3,500 pounds (1588 kg) shall be not less than 20 feet (6096 mm) in length and width. The ~~((touchdown))~~ landing area shall be surrounded on all sides by a clear area having minimum average width at roof level of 15 feet (4572 mm) and not less than 5 feet (1524 mm) at any point. The clear area shall be maintained.

**2007.3 Flammable and Class II combustible liquid spillage.** Landing areas on structures shall be maintained so as to confine *flammable* or Class II *combustible liquid* spillage to the landing area itself, and provisions shall be made to drain such spillage away from *exits* or *stairways* serving the helicopter landing area or from a structure housing such *exit* or *stairway*.

**2007.4 Exits.** *Exits* and *stairways* shall be maintained in accordance with Section ~~((412-7))~~ 412.8 of the *International Building Code*.

**[S] 2007.5 Standpipe systems.** A building, ~~((with))~~ equipped with a standpipe system, that has a rooftop helistop or heliport shall be provided with a Class I or III standpipe system extended to the roof level on which the helistop or heliport is located. All portions of the helistop and heliport area shall be within 150 feet (45 720 mm) of a 2-1/2-inch (63.5 mm) outlet on the standpipe system.

**2007.6 Foam protection.** Foam fire-protection capabilities shall be provided for rooftop heliports. Such systems shall be designed, installed and maintained in accordance with the applicable provisions of Sections 903, 904 and 905.

**2007.7 Fire extinguishers.** Not less than one portable fire extinguisher having a minimum 80-B:C rating shall be provided for each permanent takeoff and landing area and for the aircraft parking areas. Installation, inspection and maintenance of these extinguishers shall be in accordance with Section 906.

**2007.8 Federal approval.** Before operating helicopters from helistops and heliports, approval shall be obtained from the Federal Aviation Administration.

**[S] 2007.9 Restrictions in Fire District.** Heliports shall not be located in the *Fire District*.

## CHAPTER 22

# COMBUSTIBLE DUST-PRODUCING OPERATIONS

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**User note:**

**About this chapter:** Chapter 22 provides requirements that seek to reduce the likelihood of dust explosions by managing the hazards of ignitable suspensions of combustible dusts associated with a variety of operations including woodworking, mining, food processing, agricultural commodity storage and handling and pharmaceutical manufacturing, among others. This chapter provides various requirements to control ignition sources, use properly listed and designed dust collection systems, maintain good housekeeping practices and provide proper training to those involved in these processes. Appropriate standards are referenced to deal with the specific dust hazards.

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### SECTION 2201 GENERAL

**[S] 2201.1 Scope.** The equipment, processes and operations involving dust explosion hazards and use or handling of *combustible dust* shall comply with the provisions of this chapter.

**Exceptions:**

1. Storage and use of consumer materials in Group B or R occupancies.
2. Storage and use of commercially packaged materials in Group M occupancies.
3. Materials displayed in original packaging in Group M occupancies and intended as building materials or for personal or household use.
4. Storage of sealed containers of *combustible dust* at facilities not associated with an operation that uses, handles or generates *combustible dust*.
5. Materials stored or used in farm buildings or similar occupancies intended for on-premises agricultural purposes.
6. Equipment or machinery located inside buildings that emit dust but are used on an intermittent basis, including, but not limited to, model shops, research and development facilities, hobby, and other non-production uses, shall be provided with a local, point of use dust collection system. The dust collector can be a portable type with high efficiency filters to allow exhaust air to be discharged back into the space. Such collectors are not required to be provided with an approved explosion-control system. Such systems shall be limited to no more than 1,500 cfm.

**2201.2 Permits.** Permits shall be required for *combustible dust*-producing operations as set forth in Section 105.5.

### SECTION 2202 DEFINITIONS

**2202.1 Definition.** The following terms are defined in Chapter 2:

**COMBUSTIBLE DUST.**

**DUST COLLECTION SYSTEM.**

### SECTION 2203 DUST EXPLOSION PREVENTION

**2203.1 Critical depth layer.** The maximum dust layer on all surfaces, including but not limited to walls, ceilings, beams, equipment, furniture, pipes and ducts, shall not exceed the critical depth layer specified in Table 2203.1. The critical depth layer is permitted to be adjusted for explosion hazard where further evaluated in accordance with one of the following:

1. Section 7.2.1.3 of NFPA 654.
2. Section 4.1.3.3 of NFPA 664 for wood flour.

Accumulated *combustible dust* shall be collected by one of the methods listed in Section 2203.5.

## CHAPTER 23

# MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

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**User note:**

**About this chapter:** Chapter 23 sets forth regulations for motor fuel-dispensing stations and repair garages. It addresses both liquid and gaseous motor fuels associated with automotive, marine, aircraft and fleet vehicle motor fuel-dispensing facilities. The repair garage provisions specifically address hazards associated with the different types of fuel used, including flammable and combustible liquids, hydrogen, LPG, LNG and CNG.

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### SECTION 2301 GENERAL

**2301.1 Scope.** Automotive motor fuel-dispensing facilities, marine motor fuel-dispensing facilities, fleet vehicle motor fuel-dispensing facilities, aircraft motor-vehicle fuel-dispensing facilities and repair garages shall be in accordance with this chapter and the *International Building Code*, *International Fuel Gas Code* and *International Mechanical Code*. Such operations shall include both those that are open to the public and private operations.

#### **2301.1 Point of Information**

For provisions relating to the transfer of flammable and combustible liquids directly from tank vehicles into the fuel tanks of motor vehicles located at commercial, industrial, governmental, or manufacturing establishments, see Section 5706.5.4.5. For provisions relating to on-demand mobile fueling, see Section 5707.

**2301.2 Permits.** Permits shall be required as set forth in Section 105.5.

**2301.3 Construction documents.** *Construction documents* shall be submitted for review and approval prior to the installation or construction of automotive, marine or fleet vehicle motor fuel-dispensing facilities and repair garages in accordance with Section 106.1.

**2301.4 Indoor motor fuel-dispensing facilities.** Motor fuel-dispensing facilities located inside buildings shall comply with the *International Building Code* and NFPA 30A.

**2301.4.1 Protection of floor openings in indoor motor fuel-dispensing facilities.** Where motor fuel-dispensing facilities are located inside buildings and the dispensers are located above spaces within the building, openings beneath dispensers shall be sealed to prevent the flow of leaked fuel to lower building spaces.

**2301.5 Electrical.** Electrical wiring and equipment shall be suitable for the locations in which they are installed and shall comply with Section 603, NFPA 30A and NFPA 70.

**2301.6 Heat-producing appliances.** Heat-producing appliances shall be suitable for the locations in which they are installed and shall comply with NFPA 30A and the *International Fuel Gas Code* or the *International Mechanical Code*.

### SECTION 2302 DEFINITIONS

**2302.1 Definitions.** The following terms are defined in Chapter 2:

[S] AIRCRAFT MOTOR-VEHICLE (~~(FUEL-DISPENSING))~~ FUEL-DISPENSING FACILITY.

ALCOHOL-BLENDED FUELS.

AUTOMOTIVE MOTOR FUEL-DISPENSING FACILITY.

DISPENSING DEVICE, OVERHEAD TYPE.

FLEET VEHICLE MOTOR FUEL-DISPENSING FACILITY.

LIQUEFIED NATURAL GAS (LNG).

MARINE MOTOR FUEL-DISPENSING FACILITY.

REPAIR GARAGE.

SELF-SERVICE MOTOR FUEL-DISPENSING FACILITY.



## MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

### SECTION 2303 LOCATION OF DISPENSING DEVICES

**2303.1 Location of dispensing devices.** Dispensing devices shall be located as follows:

1. Ten feet (3048 mm) or more from *lot lines*.
2. Ten feet (3048 mm) or more from buildings having combustible exterior wall surfaces or buildings having noncombustible exterior wall surfaces that are not part of a 1-hour fire-resistance-rated assembly or buildings having combustible overhangs.  
**Exception:** Canopies constructed in accordance with the *International Building Code* providing weather protection for the fuel islands.
3. Such that all portions of the vehicle being fueled will be on the premises of the motor fuel-dispensing facility.
4. Such that the nozzle, where the hose is fully extended, will not reach within 5 feet (1524 mm) of building openings.
5. Twenty feet (6096 mm) or more from fixed sources of ignition.
6. Such that fuel dispensing is in view of the attendant at attended self-service motor fuel-dispensing facilities, as required by Section 2304.2.4.

**[S] 2303.2 Emergency disconnect switches.** An *approved* emergency disconnect switch shall be provided at an *approved* location to stop the transfer of fuel to the fuel dispensers in the event of a fuel spill or other emergency. The emergency disconnect switch for exterior fuel dispensers shall be provided with *ready access* and shall be located within 100 feet (30 480 mm) of, but not less than 20 feet (6096 mm) from, the fuel dispensers. For interior fuel-dispensing operations, the emergency disconnect switch shall be provided with *ready access* and be installed at an *approved* location. Such devices shall be distinctly *labeled* as: “EMERGENCY FUEL SHUTOFF.” Signs shall be provided in *approved* locations, and letters shall not be less than 3 inches (76.2 mm) in height and 1/2 inch (12.7 mm) in stroke.

**2303.2.1 Height.** The height of the emergency disconnect switch shall be not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) measured vertically, from the floor level to the activating button.

### SECTION 2304 DISPENSING OPERATIONS

**2304.1 Supervision of dispensing.** The dispensing of fuel at motor fuel-dispensing facilities shall be conducted by a qualified attendant or shall be under the supervision of a qualified attendant at all times or shall be in accordance with Section 2304.3.

**2304.2 Attended self-service motor fuel-dispensing facilities.** Attended self-service motor fuel-dispensing facilities shall comply with Sections 2304.2.1 through 2304.2.5. Attended self-service motor fuel-dispensing facilities shall have not less than one qualified attendant on duty while the facility is open for business. The attendant’s primary function shall be to supervise, observe and control the dispensing of fuel. The attendant shall prevent the dispensing of fuel into containers that do not comply with Section 2304.4.1, control sources of ignition, give immediate attention to accidental spills or releases, and be prepared to use fire extinguishers.

**2304.2.1 Special-type dispensers.** *Approved* special-dispensing devices and systems such as, but not limited to, card- or coin-operated and remote-preset types, are allowed at motor fuel-dispensing facilities provided that there is not less than one qualified attendant on duty while the facility is open to the public. Remote preset-type devices shall be set in the “off” position while not in use so that the dispenser cannot be activated without the knowledge of the attendant.

**2304.2.2 Emergency controls.** *Approved* emergency controls shall be provided in accordance with Section 2303.2.

**2304.2.3 Operating instructions.** Dispenser operating instructions shall be conspicuously posted in *approved* locations on every dispenser.

**2304.2.4 Obstructions to view.** The attendant shall have a direct line of sight to observe fuel-dispensing operations at all times. Obstructions shall not be placed between the dispensing area and the attendant.

**Exception:** Video monitoring systems shall be permitted to supplement direct line of sight supervision where *approved* by the *fire code official*.

**2304.2.5 Communications.** The attendant shall be able to communicate with persons in the dispensing area at all times. An *approved* method of communicating with the fire department shall be provided for the attendant.

**2304.3 Unattended self-service motor fuel-dispensing facilities.** Unattended self-service motor fuel-dispensing facilities shall comply with Sections 2304.3.1 through 2304.3.7.

**2304.3.1 General.** Where *approved*, unattended self-service motor fuel-dispensing facilities are allowed. As a condition of approval, the *owner* or operator shall provide, and be accountable for, daily site visits, regular equipment inspection and maintenance.

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**2304.3.2 Dispensers.** Dispensing devices shall comply with Section 2306.7. Dispensing devices operated by the insertion of coins or currency shall not be used unless *approved*.

**2304.3.3 Emergency controls.** *Approved* emergency controls shall be provided in accordance with Section 2303.2. Emergency controls shall be of a type that is only manually resettable.

**2304.3.4 Operating instructions.** Dispenser operating instructions shall be conspicuously posted in *approved* locations on every dispenser and shall indicate the location of the emergency controls required by Section 2304.3.3.

**2304.3.5 Emergency procedures.** An *approved* emergency procedures sign, in addition to the signs required by Section 2305.6, shall be posted in a conspicuous location and shall read:

IN CASE OF FIRE, SPILL OR RELEASE

1. USE EMERGENCY PUMP SHUTOFF
2. REPORT THE ACCIDENT!

FIRE DEPARTMENT TELEPHONE NO. \_\_\_\_\_

FACILITY ADDRESS \_\_\_\_\_

**2304.3.6 Communications.** A telephone not requiring a coin to operate or other *approved*, clearly identified means to notify the fire department shall be provided on the site in a location *approved* by the *fire code official*.

**2304.3.7 Quantity limits.** Dispensing equipment used at unsupervised locations shall comply with one of the following:

1. Dispensing devices shall be programmed or set to limit uninterrupted fuel delivery to 25 gallons (95 L) and require a manual action to resume delivery.
2. The amount of fuel being dispensed shall be limited in quantity by a preprogrammed card as *approved*.

**2304.4 Dispensing into portable containers.** The dispensing of *flammable* or *combustible liquids* into portable *approved* containers shall comply with Sections 2304.4.1 through 2304.4.3.

[S] **2304.4.1 Approved containers required.** Class I, II and IIIA liquids shall not be dispensed into a portable container unless such container does not exceed a 6-gallon (22.7 L) capacity, is *listed* or of *approved* material and construction, and has a tight closure with a screwed or spring-loaded cover so designed that the contents can be dispensed without spilling. Liquids shall not be dispensed into portable or cargo tanks.

It is unlawful to sell, offer for sale, or distribute any container for the storage and/or handling of flammable liquids, unless such container has been *approved* for such purpose under applicable provisions of this code.

**2304.4.2 Nozzle operation.** A hose nozzle valve used for dispensing Class I liquids into a portable container shall be in compliance with Section 2306.7.6 and be manually held open during the dispensing operation.

**2304.4.3 Location of containers being filled.** Portable containers shall not be filled while located inside the trunk, passenger compartment or truck bed of a vehicle.

## SECTION 2305 OPERATIONAL REQUIREMENTS

**2305.1 Tank filling operations for Class I, II or III liquids.** Delivery operations to tanks for Class I, II or III liquids shall comply with Sections 2305.1.1 through 2305.1.3 and the applicable requirements of Chapter 57.

**2305.1.1 Delivery vehicle location.** Where liquid delivery to above-ground storage tanks is accomplished by positive-pressure operation, tank vehicles shall be positioned not less than 25 feet (7620 mm) from tanks receiving Class I liquids and 15 feet (4572 mm) from tanks receiving Class II and IIIA liquids, measured from the tank to the nearest unloading valve on the tank vehicle.

**2305.1.2 Tank capacity calculation.** The driver, operator or attendant of a tank vehicle shall, before making delivery to a tank, determine the unfilled, available capacity of such tank by an *approved* gauging device.

**2305.1.3 Tank fill connections.** Delivery of *flammable liquids* to tanks more than 1,000 gallons (3785 L) in capacity shall be made by means of *approved* liquid- and vapor-tight connections between the delivery hose and tank fill pipe. Where tanks are equipped with any type of vapor recovery system, all connections required to be made for the safe and proper functioning of the particular vapor recovery process shall be made. Such connections shall be made liquid and vapor tight and remain connected throughout the unloading process. Vapors shall not be discharged at grade level during delivery.

**2305.2 Equipment maintenance and inspection.** Motor fuel-dispensing facility equipment shall be maintained in proper working order at all times in accordance with Sections 2305.2.1 through 2305.2.5.

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shall be ascertained separately for each tank system. A consistent or accidental loss of product shall be immediately reported to the *fire code official*.

**2306.2.2 Above-ground tanks located inside buildings.** Above-ground tanks for the storage of Class I, II and IIIA liquid fuels are allowed to be located in buildings. Such tanks shall be located in special enclosures complying with Section 2306.2.6, in a liquid storage room or a liquid storage warehouse complying with Chapter 57, or shall be *listed* and *labeled* as protected above-ground tanks in accordance with UL 2085.

**[S] 2306.2.3 Above-ground tanks located outdoors, above grade.** Above-ground tanks shall not be used for the storage of Class I, II or III liquid motor fuels, except as provided by this section.

1. Above-ground tanks used for outdoor, above-grade storage of Class I liquids shall be *listed* and *labeled* as protected above-ground tanks in accordance with UL 2085 and shall be in accordance with Chapter 57. Such tanks shall be located in accordance with Table 2306.2.3, and are only allowed to be located outside the *Fire District* in industrial zones as defined in the *Seattle Land Use Code*.
2. Above-ground tanks used for outdoor, above-grade storage of Class II or IIIA liquids shall be *listed* and *labeled* as protected above-ground tanks in accordance with UL 2085 and shall be installed in accordance with Chapter 57. Tank locations shall be in accordance with Table 2306.2.3.

**Exception:** Other above-ground tanks that comply with Chapter 57 where *approved* by the *fire code official*.

3. Tanks containing fuels shall not exceed 12,000 gallons (45 420 L) in individual capacity or ~~((48,000 gallons (181 680 L)))~~ 12,000 gallons (45 420 L) in aggregate capacity. Installations with the maximum allowable aggregate capacity shall be separated from other such installations by not less than 100 feet (30 480 mm).

**Exception:** Tanks containing Class II or IIIA liquid fuels are allowed up to a maximum aggregate capacity of 48,000 gallons (181 680 L) with a maximum aggregate capacity of all flammable and combustible liquids in above-ground tanks of 48,000 gallons (181 680 L).

4. Tanks located at farms, construction projects or rural areas shall comply with Section 5706.2.
5. Above-ground tanks used for outdoor, above-grade storage of Class IIIB liquid motor fuel shall be *listed* and *labeled* in accordance with UL 142 or *listed* and *labeled* as protected above-ground tanks in accordance with UL 2085 and shall be installed in accordance with Chapter 57. Tank locations shall be in accordance with Table 2306.2.3.

**TABLE 2306.2.3  
MINIMUM SEPARATION REQUIREMENTS FOR ABOVE-GROUND TANKS**

TANK TYPE	INDIVIDUAL TANK CAPACITY (gallons)	MINIMUM DISTANCE FROM NEAREST IMPORTANT BUILDING ON SAME PROPERTY (feet)	MINIMUM DISTANCE FROM NEAREST FUEL DISPENSER (feet)	MINIMUM DISTANCE FROM LOT LINE THAT IS OR CAN BE BUILT ON, INCLUDING THE OPPOSITE SIDE OF A PUBLIC WAY (feet)	MINIMUM DISTANCE FROM NEAREST SIDE OF ANY PUBLIC WAY (feet)	MINIMUM DISTANCE BETWEEN TANKS (feet)
Protected above-ground tanks	Less than or equal to 6,000	5	25 <sup>a, c</sup>	15	5	3
	Greater than 6,000	15	25 <sup>a, c</sup>	25	15	3
Tanks in vaults	0–20,000	0 <sup>b</sup>	0	0 <sup>b</sup>	0	Separate compartment required for each tank
Other tanks	All	50	50	100	50	3

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

- a. At fleet vehicle motor fuel-dispensing facilities, a minimum separation distance is not required.
- b. Underground vaults shall be located such that they will not be subject to loading from nearby structures, or they shall be designed to accommodate applied loads from existing or future structures that can be built nearby.
- c. For Class IIIB liquids in protected above-ground tanks, a minimum separation distance is not required.

**2306.2.4 Above-ground tanks located in above-grade vaults or below-grade vaults.** Above-ground tanks used for storage of Class I, II or IIIA liquid motor fuels are allowed to be installed in vaults located above grade or below grade in accordance with Section 5704.2.8 and shall comply with Sections 2306.2.4.1 and 2306.2.4.2. Tanks in above-grade vaults shall also comply with Table 2306.2.3.

**[S] 2306.2.4.1 Tank capacity limits.** Tanks storing Class I and Class II liquids at an individual site shall be limited to a maximum individual capacity of ~~((15,000 gallons (56 775 L)))~~ 12,000 gallons (45 420 L) and an aggregate capacity of ~~((48,000 gallons (181 680 L)))~~ 12,000 gallons (45 420 L).

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**Exception:** Tanks containing Class II or IIIA liquid fuels are allowed up to a maximum aggregate capacity of 48,000 gallons (181 680 L).

**2306.2.4.2 Fleet vehicle motor fuel-dispensing facilities.** Tanks storing Class II and Class IIIA liquids at a fleet vehicle motor fuel-dispensing facility shall be limited to a maximum individual capacity of 20,000 gallons (75 700 L) and an aggregate capacity of 80,000 gallons (302 800 L).

**2306.2.5 Portable tanks.** Where *approved* by the *fire code official*, portable tanks are allowed to be temporarily used in conjunction with the dispensing of Class I, II or III liquids into the fuel tanks of motor vehicles or motorized equipment on premises not normally open to the public. The approval shall include a definite time limit.

**2306.2.6 Special enclosures.** Where installation of tanks in accordance with Section 5704.2.11 is impractical, or because of property or building limitations, tanks for liquid motor fuels are allowed to be installed in buildings in special enclosures in accordance with all of the following:

1. The special enclosure shall be liquid tight and vapor tight.
2. The special enclosure shall not contain backfill.
3. Sides, top and bottom of the special enclosure shall be of reinforced concrete not less than 6 inches (152 mm) thick, with openings for inspection through the top only.
4. Tank connections shall be piped or closed such that neither vapors nor liquid can escape into the enclosed space between the special enclosure and any tanks inside the special enclosure.
5. Means shall be provided whereby portable equipment can be employed to discharge to the outside any vapors that might accumulate inside the special enclosure should leakage occur.
6. Tanks containing Class I, II or IIIA liquids inside a special enclosure shall not exceed 6,000 gallons (22 710 L) in individual capacity or 18,000 gallons (68 130 L) in aggregate capacity.
7. Each tank within special enclosures shall be surrounded by a clear space of not less than 3 feet (910 mm) to allow for maintenance and inspection.

**2306.3 Security.** Above-ground tanks for the storage of liquid motor fuels shall be safeguarded from public access or unauthorized entry in an *approved* manner.

**2306.4 Physical protection.** Guard posts complying with Section 312 or other *approved* means shall be provided to protect above-ground tanks against impact by a motor vehicle unless the tank is *listed* as a protected above-ground tank with vehicle impact protection.

**2306.5 Secondary containment.** Above-ground tanks shall be provided with drainage control or diking in accordance with Chapter 57. Drainage control and diking is not required for *listed* secondary containment tanks. Secondary containment systems shall be monitored either visually or automatically. Enclosed secondary containment systems shall be provided with emergency venting in accordance with Section 2306.6.2.5.

**2306.6 Piping, valves, fittings and ancillary equipment for use with flammable or combustible liquids.** The design, fabrication, assembly, testing and inspection of piping, valves, fittings and ancillary equipment for use with *flammable* or *combustible liquids* shall be in accordance with Chapter 57 and Sections 2306.6.1 through 2306.6.3.

**2306.6.1 Protection from damage.** Piping shall be located such that it is protected from physical damage.

**2306.6.2 Piping, valves, fittings and ancillary equipment for above-ground tanks for Class I, II and III liquids.** Piping, valves, fittings and ancillary equipment for above-ground tanks storing Class I, II and III liquids shall comply with Sections 2306.6.2.1 through 2306.6.2.6.

**2306.6.2.1 Tank openings.** Tank openings for above-ground tanks shall be through the top only.

**2306.6.2.2 Fill-pipe connections.** The fill pipe for above-ground tanks shall be provided with a means for making a direct connection to the tank vehicle's fuel-delivery hose so that the delivery of fuel is not exposed to the open air during the filling operation. Where any portion of the fill pipe exterior to the tank extends below the level of the top of the tank, a check valve shall be installed in the fill pipe not more than 12 inches (305 mm) from the fill-hose connection.

**2306.6.2.3 Overfill protection.** Overfill protection shall be provided for above-ground *flammable* and *combustible liquid* storage tanks in accordance with Sections 5704.2.7.5.8 and 5704.2.9.7.5.

**2306.6.2.4 Siphon prevention.** An *approved* anti-siphon method shall be provided in the piping system to prevent flow of liquid by siphon action.

**2306.6.2.5 Emergency relief venting.** Above-ground storage tanks, tank compartments and enclosed secondary containment spaces shall be provided with emergency relief venting in accordance with Chapter 57.

**2306.6.2.6 Spill containers.** A spill container having a capacity of not less than 5 gallons (19 L) shall be provided for each fill connection. For tanks with a top fill connection, spill containers shall be noncombustible and shall be fixed to

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**Exception:** Where the required distances to buildings, *lot lines* or fuel-transfer areas cannot be obtained, means shall be provided to protect equipment against fire exposure. Acceptable means shall include but not be limited to either of the following:

1. *Approved* protective enclosures, which extend not less than 18 inches (457 mm) above the equipment, constructed of fire-resistant or noncombustible materials.
2. Fire protection using an *approved* water-spray system.

**2306.7.9.2.2.1 Distance from dispensing devices.** Vapor-processing equipment shall be located not less than 20 feet (6096 mm) from dispensing devices.

**2306.7.9.2.2.2 Physical protection.** Vapor-processing equipment shall be protected against physical damage by guardrails, curbs, protective enclosures or fencing. Where *approved* protective enclosures are used, *approved* means shall be provided to ventilate the volume within the enclosure to prevent pocketing of flammable vapors.

**2306.7.9.2.2.3 Downslopes.** Where a downslope exists toward the location of the vapor-processing unit from a fuel-transfer area, the *fire code official* is authorized to require additional separation by distance and height.

**2306.7.9.2.3 Installation.** Vapor-processing units shall be securely mounted on concrete, masonry or structural steel supports on concrete or other noncombustible foundations. Vapor-recovery and vapor-processing equipment is allowed to be installed on roofs where *approved*.

**2306.7.9.2.4 Piping.** Piping in a mechanical-assist system shall be in accordance with Section 5703.6.

**2306.8 Alcohol-blended fuel-dispensing operations.** The design, fabrication and installation of *alcohol-blended fuel*-dispensing systems shall be in accordance with Section 2306.7 and Sections 2306.8.1 through 2306.8.6.

**2306.8.1 Listed equipment.** Dispensers shall be *listed* in accordance with UL 87A. Hoses, nozzles, breakaway fittings, swivels, flexible connectors or dispenser emergency shutoff valves, vapor recovery systems, leak detection devices and pumps used in alcohol-blended fuel-dispensing systems shall be *listed* for the specific purpose.

**2306.8.2 Compatibility.** Dispensers shall be used only with the fuels for which they have been *listed* and that are marked on the product. Field-installed components including hose assemblies, breakaway fittings, swivel connectors and hose nozzle valves shall be provided in accordance with the listing and the marking on the unit.

**2306.8.3 Change of system contents.** Fuel-dispensing systems subject to change in contents from gasoline to alcohol-blended fuels shall be subject to *fire code official* review and approval prior to commencing dispensing operations.

**2306.8.4 Facility identification.** Facilities dispensing alcohol-blended fuels shall be identified by an *approved* means.

**2306.8.5 Marking.** Dispensers shall be marked in an *approved* manner to identify the types of *alcohol-blended fuels* to be dispensed.

**2306.8.6 Maintenance and inspection.** Equipment shall be maintained and inspected in accordance with Section 2305.2.

## SECTION 2307 LIQUEFIED PETROLEUM GAS MOTOR FUEL-DISPENSING FACILITIES

**2307.1 General.** Motor fuel-dispensing facilities for liquefied petroleum gas (LP-gas) fuel shall be in accordance with this section and Chapter 61.

**[S] 2307.1.1 Prohibited locations.** Motor fuel-dispensing facilities for liquefied petroleum gas (LP-gas) fuel are prohibited in the *Fire District*.

**2307.2 Approvals.** Storage vessels and equipment used for the storage or dispensing of LP-gas shall be *approved* or *listed* in accordance with Sections 2307.2.1 and 2307.2.2.

**2307.2.1 Approved equipment.** Containers, pressure relief devices (including pressure relief valves), pressure regulators and piping for LP-gas shall be *approved*.

**2307.2.2 Listed equipment.** Hoses, hose connections, vehicle fuel connections, dispensers, LP-gas pumps and electrical equipment used for LP-gas shall be *listed*.

**2307.3 Attendants.** Motor fuel-dispensing operations for LP-gas shall be conducted by qualified attendants or in accordance with Section 2307.7 by persons trained in the proper handling of LP-gas.

**2307.4 Location of dispensing operations and equipment.** The point of transfer for LP-gas dispensing operations shall be separated from buildings and other exposures in accordance with the following:

1. Not less than 25 feet (7620 mm) from buildings where the *exterior wall* is not part of a *fire-resistance-rated* assembly having a rating of 1 hour or greater.

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4. The dispenser and hose-end valve shall release not more than 1/8 fluid ounce (4 cc) of liquid to the atmosphere upon breaking the connection with the fill valve on the vehicle.
5. Portable fire extinguishers shall be provided in accordance with Section 2305.5.
6. Warning signs shall be provided in accordance with Section 2305.6.
7. The area around the dispenser shall be maintained in accordance with Section 2305.7.

**2307.8 Overfilling.** LP-gas containers shall not be filled with LP-gas in excess of the volume determined using the fixed maximum liquid level gauge installed on the container, the volume determined by the overfilling prevention device installed on the container or the weight determined by the required percentage of the water capacity marked on the container.

### SECTION 2308 COMPRESSED NATURAL GAS MOTOR FUEL-DISPENSING FACILITIES

**2308.1 General.** Motor fuel-dispensing facilities for compressed natural gas (CNG) fuel shall be in accordance with this section, Chapter 53 and Section 413 of the *International Fuel Gas Code*.

**[S] 2308.1.1 Prohibited locations.** Motor fuel-dispensing facilities for compressed natural gas (CNG) fuel are prohibited in the *Fire District*.

**2308.2 Approvals.** Storage vessels and equipment used for the storage, compression or dispensing of CNG shall be *approved* or *listed* in accordance with Sections 2308.2.1 through 2308.2.4.

**2308.2.1 Approved equipment.** Containers, compressors, pressure relief devices (including pressure relief valves), and pressure regulators and piping used for CNG shall be *approved*.

**2308.2.2 Listed equipment.** Hoses, hose connections, dispensers and electrical equipment used for CNG shall be *listed*. Vehicle-fueling connections shall be *listed* and *labeled*.

**2308.2.3 Residential fueling appliance (RFA).** Residential fueling appliances shall be *listed* and installed in accordance with the installation requirements of CSA/ANSI NGV 5.1, manufacturer's installation instructions and Section 413 of the *International Fuel Gas Code*. The capacity of an RFA shall not exceed 5 cubic feet per minute (0.14 m<sup>3</sup>/min) of natural gas.

**2308.2.4 Vehicle fueling appliance (VFA).** Nonresidential fueling appliances shall be *listed* and installed in accordance with the installation requirements of CSA/ANSI NGV 5.2, manufacturer's installation instructions and the requirements of Section 413 of the *International Fuel Gas Code* for VFAs. The capacity of the VFA shall not exceed 10 cubic feet per minute (0.28 m<sup>3</sup>/min) of natural gas.

**2308.3 Location of dispensing operations and equipment.** Compression, storage and dispensing equipment shall be located above ground, outdoors.

#### Exceptions:

1. Compression, storage or dispensing equipment shall be allowed in buildings of noncombustible construction, as set forth in the *International Building Code*, that are unenclosed for three-quarters or more of the perimeter.
2. Compression, storage and dispensing equipment shall be allowed indoors or in vaults in accordance with Chapter 53.

**2308.3.1 Location on property.** In addition to the requirements of Section 2303.1, compression, storage and dispensing equipment not located in vaults complying with Chapter 53 shall be installed as follows:

1. Not beneath power lines.
2. Ten feet (3048 mm) or more from the nearest building or *lot line* that could be built on, public street, sidewalk or source of ignition.

**Exception:** Dispensing equipment need not be separated from canopies that are constructed in accordance with the *International Building Code* and that provide weather protection for the dispensing equipment.

3. Twenty-five feet (7620 mm) or more from the nearest rail of any railroad track and 50 feet (15 240 mm) or more from the nearest rail of any railroad main track or any railroad or transit line where power for train propulsion is provided by an outside electrical source, such as third rail or overhead catenary.
4. Fifty feet (15 240 mm) or more from the vertical plane below the nearest overhead wire of a trolley bus line.

**2308.4 Private fueling of motor vehicles.** Self-service CNG-dispensing systems, including key, code and card lock dispensing systems, shall be limited to the filling of permanently mounted fuel containers on CNG-powered vehicles.

In addition to the requirements in Section 2305, the *owner* of a self-service CNG motor fuel-dispensing facility shall ensure the safe operation of the system and the training of users.

At the connection fitting of the vent tube and the CNG cylinder, a *listed* bidirectional *detonation* flame arrester shall be provided.

**2308.8.1.2.6 Signage.** *Approved* “No Smoking” signs complying with Section 310 shall be posted within 10 feet (3048 mm) of the cylinder support structure or appurtenance. *Approved* “Cylinder Shall Be Bonded” signs shall be posted on the cylinder support structure or appurtenance.

## SECTION 2309 HYDROGEN MOTOR FUEL-DISPENSING AND GENERATION FACILITIES

**2309.1 General.** Hydrogen motor fuel-dispensing and generation facilities shall be in accordance with this section, Chapter 58 and NFPA 2. Where a fuel-dispensing facility includes a repair garage, the repair operation shall comply with Section 2311.

**[S] 2309.1.1 Prohibited locations.** Hydrogen motor fuel-dispensing and generation facilities are prohibited in the *Fire District*.

**2309.2 Equipment.** Equipment used for the generation, compression, storage or dispensing of hydrogen shall be designed for the specific application in accordance with Sections 2309.2.1 through 2309.2.3.

**2309.2.1 Approved equipment.** Cylinders, containers and tanks; pressure relief devices, including pressure valves; hydrogen vaporizers; pressure regulators; and piping used for gaseous hydrogen systems shall be designed and constructed in accordance with Chapters 53, 55 and 58.

**2309.2.2 Listed or approved equipment.** Hoses, hose connections, compressors, hydrogen generators, dispensers, motor-fueling connections and electrical equipment used for hydrogen shall be *listed* or *approved* for use with hydrogen.

**2309.2.3 Electrical equipment.** Electrical installations shall be in accordance with NFPA 70.

**2309.3 Location on property.** In addition to the requirements of Section 2303.1, dispensing equipment shall be located in accordance with Sections 2309.3.1 through Section 2309.3.2.

**2309.3.1 Location of operations and equipment.** Generation, compression, storage and dispensing equipment shall be located in accordance with Sections 2309.3.1.1 through 2309.3.1.5.5.

**2309.3.1.1 Outdoors.** Generation, compression or storage equipment shall be allowed outdoors in accordance with Chapter 58 and NFPA 2.

**2309.3.1.2 Indoors.** Generation, compression, storage and dispensing equipment shall be located in indoor rooms or areas constructed in accordance with the requirements of the *International Building Code*, the *International Fuel Gas Code*, the *International Mechanical Code* and NFPA 2.

**2309.3.1.2.1 Maintenance.** Gaseous hydrogen systems and detection devices shall be maintained in accordance with the manufacturer’s instructions.

**2309.3.1.2.2 Smoking.** Smoking shall be prohibited in hydrogen cutoff rooms. “No Smoking” signs shall be provided at all entrances to hydrogen fuel gas rooms.

**2309.3.1.2.3 Ignition source control.** Open flames, flame-producing devices and other sources of ignition shall be controlled in accordance with Chapter 58.

**2309.3.1.2.4 Housekeeping.** Hydrogen fuel gas rooms shall be kept free from combustible debris and storage.

**2309.3.1.3 Gaseous hydrogen storage.** Storage of gaseous hydrogen shall be in accordance with Chapters 53 and 58.

**2309.3.1.4 Liquefied hydrogen storage.** Storage of liquefied hydrogen shall be in accordance with Chapters 55 and 58.

**2309.3.1.5 Canopy tops.** Gaseous hydrogen compression and storage equipment located on top of motor fuel-dispensing facility canopies shall be in accordance with Sections 2309.3.1.5.1 through 2309.3.1.5.5, Chapters 53 and 58, and the *International Fuel Gas Code*.

**2309.3.1.5.1 Construction.** Canopies shall be constructed in accordance with the motor fuel-dispensing facility canopy requirements of Section 406.7 of the *International Building Code*.

**2309.3.1.5.2 Fire-extinguishing systems.** Fuel-dispensing areas under canopies shall be equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1. The design of the sprinkler system shall be not less than that required for Extra Hazard Group 2 occupancies. Operation of the sprinkler system shall activate the emergency functions of Sections 2309.3.1.5.3 and 2309.3.1.5.4.

**2309.3.1.5.3 Emergency discharge.** Operation of the *automatic sprinkler system* shall activate an automatic emergency discharge system, which will discharge the hydrogen gas from the equipment on the canopy top through the vent pipe system.

## MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

**2311.8.10 Classified electrical area.** Areas within 18 inches (450 mm) of a ceiling within a motor vehicle repair room or motor vehicle repair booth shall be designed and installed in accordance with the requirements for Class I, Division 2, classified locations, as set forth in NFPA 70.

### Exceptions:

1. Rooms with exhaust ventilation of not less than 1 cubic foot per minute per square foot ( $0.3 \text{ m}^3/\text{min}/\text{m}^2$ ) of floor area, with suction taken from a point within 18 inches (450 mm) of the highest point in the ceiling in repair garages for vehicles that use CNG, liquefied natural gas (LNG) or other lighter-than-air motor fuels.
2. Rooms used for the repair of hydrogen-fueled vehicles that have an *approved* exhaust ventilation system in accordance with the (~~International~~) *Seattle Mechanical Code* and NFPA 2.

**2311.8.11 Defueling equipment required at vehicle maintenance and repair facilities.** Facilities for repairing or replacing hydrogen fuel tanks on hydrogen-fueled vehicles shall have equipment to defuel vehicle storage tanks. Where work must be performed on a motor vehicle's fuel tank for the purpose of maintenance, repair or cylinder certification, defueling and purging shall be conducted in accordance with Section 2309.6 and NFPA 2.



## CHAPTER 24

# FLAMMABLE FINISHES

**User note:**

**About this chapter:** Chapter 24 provides requirements that govern operations where flammable or combustible finishes are applied by spraying, dipping, powder coating or flow-coating processes. As with all operations involving flammable or combustible liquids and combustible dusts or vapors, controlling ignition sources and methods of reducing or controlling flammable vapors or combustible dusts at or near these operations are emphasized.

### SECTION 2401 GENERAL

**2401.1 Scope.** This chapter shall apply to locations or areas where any of the following activities are conducted:

1. The application of flammable finishes to articles or materials by means of spray apparatus.
2. The application of flammable finishes by dipping or immersing articles or materials into the contents of tanks, vats or containers of *flammable* or *combustible liquids* for coating, finishing, treatment or similar processes.
3. The application of flammable finishes by applying combustible powders to articles or materials utilizing powder spray guns, electrostatic powder spray guns, fluidized beds or electrostatic fluidized beds.
4. Floor surfacing or finishing operations using Class I or II liquids in areas exceeding 350 square feet (32.5 m<sup>2</sup>).
5. The application of flammable finishes consisting of dual-component coatings or Class I or II liquids where applied by brush or roller in quantities exceeding 1 gallon (4 L).

**[S] 2401.2 Nonapplicability.** This chapter shall not apply to spray finishing utilizing *flammable* or *combustible liquids* (~~that do not sustain combustion,~~) including:

1. Liquids which do not sustain combustion that do not have a fire point when tested in accordance with ASTM D92.
2. Liquids which do not sustain combustion with a flashpoint greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight.
3. Mobile spray coaters registered with, and meeting the requirements of, Puget Sound Clean Air Agency.

#### **2401.2 Point of Information**

Details relating to the Puget Sound Clean Air Agency's (PSCAA) rules and requirements can be obtained online at: [www.pscleanair.gov/214/Mobile-Spray-Coaters](http://www.pscleanair.gov/214/Mobile-Spray-Coaters) or by contacting them at (206) 343-8800.

**2401.3 Permits.** Permits shall be required as set forth in Sections 105.5 and 105.6.

### SECTION 2402 DEFINITIONS

**2402.1 Definitions.** The following terms are defined in Chapter 2:

**DETEARING.**

**DIP TANK.**

**ELECTROSTATIC FLUIDIZED BED.**

**FLAMMABLE FINISHES.**

**FLAMMABLE VAPOR AREA.**

**FLUIDIZED BED.**

**LIMITED SPRAYING SPACE.**

**RESIN APPLICATION AREA.**

**ROLL COATING.**

**SPRAY BOOTH.**

Conspicuous signs with the following warning shall be posted in the vicinity of flammable vapor areas, dipping operations and paint storage rooms:

NO WELDING  
THE USE OF WELDING OR CUTTING EQUIPMENT IN OR NEAR THIS AREA  
IS DANGEROUS BECAUSE OF FIRE AND EXPLOSION HAZARDS.  
WELDING AND CUTTING SHALL BE DONE ONLY UNDER  
THE SUPERVISION OF THE PERSON IN CHARGE.

**2403.2.8 Powered industrial trucks.** Powered industrial trucks used in electrically classified areas shall be *listed* for such use.

**2403.3 Storage, use and handling of flammable and combustible liquids.** The storage, use and handling of *flammable* and *combustible liquids* shall be in accordance with this section and Chapter 57.

**2403.3.1 Use.** Containers supplying spray nozzles shall be of a closed type or provided with metal covers that are kept closed. Containers not resting on floors shall be on noncombustible supports or suspended by wire cables. Containers supplying spray nozzles by gravity flow shall not exceed 10 gallons (37.9 L) in capacity.

**2403.3.2 Valves.** Containers and piping to which a hose or flexible connection is attached shall be provided with a shutoff valve at the connection. Such valves shall be kept shut when hoses are not in use.

**2403.3.3 Pumped liquid supplies.** Where *flammable* or *combustible liquids* are supplied to spray nozzles by positive displacement pumps, pump discharge lines shall be provided with an *approved* relief valve discharging to pump suction or a safe detached location.

**2403.3.4 Liquid transfer.** Where a flammable mixture is transferred from one portable container to another, a bond shall be provided between the two containers. Not less than one container shall be grounded. Piping systems for Class I and II liquids shall be permanently grounded.

**2403.3.5 Class I liquids as solvents.** Class I liquids used as solvents shall be used in spray gun and equipment cleaning machines that have been *listed* and *approved* for such purpose or shall be used in spray booths or spray rooms in accordance with Sections 2403.3.5.1 and 2403.3.5.2.

**2403.3.5.1 Listed devices.** Cleaning machines for spray guns and equipment shall not be located in areas open to the public and shall be separated from ignition sources in accordance with their listings or by a distance of 3 feet (914 mm), whichever is greater. The quantity of solvent used in a machine shall not exceed the design capacity of the machine.

**2403.3.5.2 Within spray booths and spray rooms.** Where solvents are used for cleaning spray nozzles and auxiliary equipment within spray booths and spray rooms, the ventilating equipment shall be operated during cleaning.

**2403.3.6 Class II and III liquids.** Solvents used outside of spray booths, spray rooms or *listed* and *approved* spray gun and equipment cleaning machines shall be restricted to Class II and III liquids.

**2403.4 Operations and maintenance.** Flammable vapor areas, exhaust fan blades and exhaust ducts shall be kept free from the accumulation of deposits of combustible residues. Where excessive residue accumulates in such areas, spraying operations shall be discontinued until conditions are corrected.

**2403.4.1 Tools.** Scrapers, spuds and other tools used for cleaning purposes shall be constructed of nonsparking materials.

**2403.4.2 Residue.** Residues removed during cleaning and debris contaminated with residue shall be immediately removed from the premises and properly disposed.

**2403.4.3 Waste cans.** *Approved* metal waste cans equipped with self-closing lids shall be provided wherever rags or waste are impregnated with finishing material. Such rags and waste shall be deposited therein immediately after being utilized. The contents of waste cans shall be properly disposed of not less than once daily and at the end of each shift.

**2403.4.4 Solvent recycling.** Solvent distillation equipment used to recycle and clean dirty solvents shall comply with Section 5705.4.

## SECTION 2404 SPRAY FINISHING

**2404.1 General.** The application of *flammable* or *combustible liquids* by means of spray apparatus in continuous or intermittent processes shall be in accordance with the requirements of Sections 2403 and 2404.2 through 2404.9.4.

[S] **2404.2 Location of spray-finishing operations.** Spray-finishing operations conducted in buildings used for Group A, E, I or R occupancies shall be located in a spray room protected with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 and separated vertically and horizontally from the remainder of the building by *fire barrier* walls

## FLAMMABLE FINISHES

and *horizontal assemblies* with not less than a 1-hour *fire-resistance rating* in accordance with the *International Building Code*. In other occupancies, spray-finishing operations shall be conducted in a spray room, spray booth or limited spraying space *approved* for such use.

### Exceptions:

1. Automobile undercoating spray operations and spray-on automotive lining operations conducted in areas with *approved* natural or mechanical ventilation shall be exempt from the provisions of Section 2404 when *approved* and where utilizing Class IIIA or IIIB *combustible liquids*.
2. In buildings other than Group A, E, I or R occupancies, *approved* limited spraying space in accordance with Section 2404.9.
3. Resin application areas used for manufacturing of reinforced plastics complying with Section 2409 shall not be required to be located in a spray room, spray booth or spraying space.

Spray-finishing operations are allowed in basements only if confined to either an *approved* spray booth or an *approved* spray room protected by an *approved* automatic fire sprinkler system and if such basement is protected throughout by an *approved* automatic sprinkler system in accordance with Chapter 9.

**[W] 2404.2.1 Prohibited enclosures for spray application operations.** Inflatable or portable enclosures shall not be used for spray application of flammable finishes.

**Exception:** Enclosures for the spray application of flammable finishes in marinas, dry docking areas, or construction areas shall comply with Section 2404.3.5.

**2404.3 Design and construction.** Design and construction of spray rooms, spray booths and spray spaces shall be in accordance with Sections 2404.3.1 through 2404.3.4.1.

**2404.3.1 Spray rooms.** Spray rooms shall be constructed and designed in accordance with Section 416 of the *International Building Code* and Section 2404.3.2 of this code, and shall comply with Sections 2404.4 through 2404.8 of this code.

**2404.3.2 Floor.** Combustible floor construction in spray rooms shall be covered by *approved*, noncombustible, nonsparking material, except where combustible coverings, including but not limited to thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spray rooms.

**2404.3.3 Spray booths.** The design and construction of spray booths shall be in accordance with Sections 2404.3.3.1 through 2404.3.3.6, Sections 2404.4 through 2404.8 and NFPA 33.

**2404.3.3.1 Construction.** Spray booths shall be constructed of *approved* noncombustible materials. Aluminum shall not be used. Where walls or ceiling assemblies are constructed of sheet metal, single-skin assemblies shall be not thinner than 0.0478 inch (18 gage) (1.2 mm) and each sheet of double-skin assemblies shall be not thinner than 0.0359 inch (20 gage) (0.9 mm). Structural sections of spray booths are allowed to be sealed with latex-based or similar caulks and sealants.

**2404.3.3.2 Surfaces.** The interior surfaces of spray booths shall be smooth; shall be constructed so as to permit the free passage of exhaust air from all parts of the interior, and to facilitate washing and cleaning; and shall be designed to confine residues within the booth. Aluminum shall not be used.

**2404.3.3.3 Floor.** Combustible floor construction in spray booths shall be covered by *approved*, noncombustible, nonsparking material, except where combustible coverings, including but not limited to thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spray booths.

**2404.3.3.4 Means of egress.** *Means of egress* shall be provided in accordance with Chapter 10.

**Exception:** *Means of egress* doors from premanufactured spray booths shall be not less than 30 inches (762 mm) in width by 80 inches (2032 mm) in height.

**2404.3.3.5 Clear space.** Spray booths shall be installed so that all parts of the booth are able to be accessed for cleaning. A clear space of not less than 3 feet (914 mm) shall be maintained on all sides of the spray booth. This clear space shall be kept free of any storage or combustible construction.

### Exceptions:

1. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to or directly against an interior partition, wall or floor/ceiling assembly that has a *fire-resistance rating* of not less than 1 hour, provided that the spray booth can be adequately maintained and cleaned.
2. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to an exterior wall or a roof assembly, provided that the wall or roof is constructed of noncombustible material and the spray booth can be adequately maintained and cleaned.

**2404.3.3.6 Size.** The aggregate area of spray booths in a building shall not exceed the lesser of 10 percent of the area of any floor of a building or the basic area allowed for a Group H-2 occupancy without area increases, as set forth in the *International Building Code*.

**Exception:** One individual booth not exceeding 500 square feet (46 m<sup>2</sup>).

**2404.3.4 Spraying spaces.** Spraying spaces shall be designed and constructed in accordance with the *International Building Code*, and Section 2404.3.4.1 and Sections 2404.4 through 2404.8 of this code.

**2404.3.4.1 Floor.** Combustible floor construction in spraying spaces shall be covered by *approved*, noncombustible, nonsparking material, except where combustible coverings, such as thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spraying spaces.

**[W] 2404.3.5 Membrane enclosures.** The design, construction, protection, operation and maintenance of membrane enclosures shall be in accordance with NFPA 33.

**2404.4 Fire protection.** Spray booths and spray rooms shall be protected by an *approved* automatic fire-extinguishing system complying with Chapter 9. Protection shall extend to exhaust plenums, exhaust ducts and both sides of dry filters where such filters are used.

**2404.4.1 Fire extinguishers.** Portable fire extinguishers complying with Section 906 shall be provided for spraying areas in accordance with the requirements for an extra (high) hazard occupancy.

**2404.5 Housekeeping, maintenance and storage of hazardous materials.** Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3, 2403.4, 2404.5.1 and 2404.5.2.

**2404.5.1 Different coatings.** Spray booths, spray rooms and spraying spaces shall not be alternately utilized for different types of coating materials where the combination of materials is conducive to spontaneous ignition, unless all deposits of one material are removed from the booth, room or space and exhaust ducts prior to spraying with a different material.

**2404.5.2 Protection of sprinklers.** Automatic sprinklers installed in flammable vapor areas shall be protected from the accumulation of residue from spraying operations in an *approved* manner. Bags used as a protective covering shall be 0.003-inch-thick (0.076 mm) polyethylene or cellophane or shall be thin paper. Automatic sprinklers contaminated by over-spray particles shall be replaced with new automatic sprinklers.

**2404.6 Sources of ignition.** Control of sources of ignition shall be in accordance with Section 2403.2 and Sections 2404.6.1 through 2404.6.2.4.

**2404.6.1 Drying operations.** Spray booths and spray rooms shall not be alternately used for the purpose of drying by arrangements or methods that could cause an increase in the surface temperature of the spray booth or spray room except in accordance with Sections 2404.6.1.1 and 2404.6.1.2. Except as specifically provided in this section, drying or baking units utilizing a heating system having open flames or that are capable of producing sparks shall not be installed in a flammable vapor areas.

**2404.6.1.1 Spraying procedure.** The spraying procedure shall use low-volume spray application.

**2404.6.1.2 Drying apparatus.** Fixed drying apparatus shall comply with this chapter and the applicable provisions of Chapter 30. Where recirculation ventilation is provided in accordance with Section 2404.7.2, the heating system shall not be within the recirculation air path.

**2404.6.1.2.1 Interlocks.** The spraying apparatus, drying apparatus and ventilating system for the spray booth or spray room shall be equipped with interlocks arranged to accomplish all of the following:

1. Prevent operation of the spraying apparatus while drying operations are in progress.
2. Where the drying apparatus is located in the spray booth or spray room, prevent operation of the drying apparatus until a timed purge of spray vapors from the spray booth or spray room is complete. This purge time shall be based on completing not fewer than four air changes of spray booth or spray room volume or for a period of not less than 3 minutes, whichever is greater.
3. Have the ventilating system maintain a safe atmosphere within the spray booth or spray room during the drying process and automatically shut off drying apparatus in the event of a failure of the ventilating system.
4. Shut off the drying apparatus automatically if the air temperature within the booth exceeds 200°F (93°C).

**2404.6.1.2.2 Portable infrared apparatus.** Where a portable infrared drying apparatus is used, electrical wiring and portable infrared drying equipment shall comply with NFPA 70. Electrical equipment located within 18 inches (457 mm) of floor level shall be *approved* for Class I, Division 2, hazardous locations. Metallic parts of drying apparatus shall be electrically bonded and grounded. During spraying operations, portable drying apparatus and electrical connections and wiring thereto shall not be located within spray booths, spray rooms or other areas where spray residue would be deposited thereon.

## FLAMMABLE FINISHES

**2404.8 Interlocks.** Interlocks for spray application finishes shall be in accordance with Sections 2404.8.1 through 2404.8.2.

**2404.8.1 Automated spray application operations.** Where protecting automated spray application operations, automatic fire-extinguishing systems shall be equipped with an *approved* interlock feature that will, upon discharge of the system, automatically stop the spraying operations and workpiece conveyors into and out of the flammable vapor areas. Where the building is equipped with a fire alarm system, discharge of the automatic fire-extinguishing system shall also activate the building alarm notification appliances.

**2404.8.1.1 Alarm station.** A manual fire alarm and emergency system shutdown station shall be installed to serve each flammable vapor area. When activated, the station shall accomplish the functions indicated in Section 2404.8.1.

**2404.8.1.2 Alarm station location.** Not less than one manual fire alarm and emergency system shutdown station shall be provided with *ready access* for operating personnel. Where access to this station is likely to involve exposure to danger, an additional station shall be located adjacent to an exit from the area.

**2404.8.2 Ventilation interlock prohibited.** Air makeup and flammable vapor area exhaust systems shall not be interlocked with the fire alarm system and shall remain in operation during a fire alarm condition.

**Exception:** Where the type of fire-extinguishing system used requires such ventilation to be discontinued, air makeup and exhaust systems shall shut down and dampers shall close.

**2404.9 Limited spraying spaces.** Limited spraying spaces shall comply with Sections 2404.9.1 through 2404.9.4.

**2404.9.1 Job size.** The aggregate surface area to be sprayed shall not exceed 9 square feet (0.84 m<sup>2</sup>).

**2404.9.2 Frequency.** Spraying operations shall not be of a continuous nature.

[S] **2404.9.3 Ventilation.** (~~Positive mechanical~~) Mechanical ventilation providing not fewer than six complete air changes per hour shall be installed. Such system shall meet the requirements of this code for handling flammable vapor areas. Explosion venting is not required.

**2404.9.4 Electrical wiring.** Electrical wiring within 10 feet (3048 mm) of the floor and 20 feet (6096 mm) horizontally of the limited spraying space shall be designed for Class I, Division 2 locations in accordance with NFPA 70.

## SECTION 2405 DIPPING OPERATIONS

**2405.1 General.** Dip-tank operations shall comply with the requirements of Section 2403 and Sections 2405.2 through 2405.11.

**2405.2 Location of dip-tank operations.** Dip-tank operations conducted in buildings used for Group A, I or R occupancies shall be located in a room designed for that purpose, equipped with an *approved automatic sprinkler system* and separated vertically and horizontally from other areas in accordance with the *International Building Code*.

**2405.3 Construction of dip tanks.** Dip tanks shall be constructed in accordance with Sections 2405.3.1 through 2405.3.4.3 and NFPA 34. Dip tanks, including drain boards, shall be constructed of noncombustible material and their supports shall be of heavy metal, reinforced concrete or masonry.

**2405.3.1 Overflow.** Dip tanks greater than 150 gallons (568 L) in capacity or 10 square feet (0.93 m<sup>2</sup>) in liquid surface area shall be equipped with a trapped overflow pipe leading to an *approved* location outside the building. The bottom of the overflow connection shall be not less than 6 inches (152 mm) below the top of the tank.

**2405.3.2 Bottom drains.** Dip tanks greater than 500 gallons (1893 L) in liquid capacity shall be equipped with bottom drains that are arranged to automatically and manually drain the tank quickly in the event of a fire unless the viscosity of the liquid at normal atmospheric temperature makes this impractical. Access to the manual operation shall be from a safe location. Where gravity flow is not practicable, automatic pumps shall be provided. Such drains shall be trapped and discharged to a closed, vented salvage tank or to an *approved* outside location.

**Exception:** Dip tanks containing Class IIIB *combustible liquids* where the liquids are not heated above room temperature and the process area is protected by automatic sprinklers.

**2405.3.3 Dipping liquid temperature control.** Protection against the accumulation of vapors, self-ignition and excessively high temperatures shall be provided for dipping liquids that are heated directly or heated by the surfaces of the object being dipped.

**2405.3.4 Dip-tank covers.** Dip-tank covers allowed by Section 2405.4.1 shall be capable of manual operation and shall be automatic closing by *approved* automatic-closing devices designed to operate in the event of a fire.

**2405.3.4.1 Construction.** Covers shall be constructed of noncombustible material or be of a tin-clad type with enclosing metal applied with locked joints.

**2405.3.4.2 Supports.** Chain or wire rope shall be utilized for cover supports or operating mechanisms.

## CHAPTER 31

# TENTS, TEMPORARY SPECIAL EVENT STRUCTURES AND OTHER MEMBRANE STRUCTURES

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**User note:**

**About this chapter:** Chapter 31 provides requirements that are intended to protect temporary as well as permanent tents and air-supported and other membrane structures and temporary stage special event structures from fire and similar hazards. The provisions regulate structure location and access, anchorage, egress, heat-producing equipment, hazardous materials and operations, combustible vegetation, ignition sources, and waste accumulation. This is accomplished through requiring regular inspections and certifying continued compliance with fire safety regulations. This chapter also addresses outdoor assembly events, which are not limited to those events with tents or other membrane structures, but are regulated due to the number of people, density of those people and hazards associated with large outdoor events related to egress, fire hazards from cooking and other related concerns.

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### SECTION 3101 GENERAL

**3101.1 Scope.** *Tents*, temporary special event structures and *membrane structures* shall comply with this chapter. The provisions of Section 3103 are applicable only to temporary *tents* and *membrane structures*. The provisions of Sections 3104 and 3106 are applicable to temporary and permanent *tents* and *membrane structures*. The provisions of Section 3105 are applicable to temporary special event structures. The provisions of Section 3106 are applicable to outdoor assembly events. Other temporary structures shall comply with the *International Building Code*.

### SECTION 3102 DEFINITIONS

**3102.1 Definitions.** The following terms are defined in Chapter 2:

**AIR-INFLATED STRUCTURE.**

**AIR-SUPPORTED STRUCTURE.**

**MEMBRANE STRUCTURE.**

**TEMPORARY SPECIAL EVENT STRUCTURE.**

**TENT.**

### SECTION 3103 TEMPORARY TENTS AND MEMBRANE STRUCTURES

**3103.1 General.** *Tents* and *membrane structures* used for temporary periods shall comply with this section and Section 3106. Other temporary structures erected for a period of 180 days or less shall comply with the *International Building Code*.

**[S] 3103.2 Approval required.** *Tents* and *membrane structures* having an area in excess of 400 square feet (37 m<sup>2</sup>) shall not be erected, operated or maintained for any purpose without first obtaining a permit and approval from the *fire code official*.

**Exceptions:**

1. *Tents* used exclusively for recreational camping purposes.
2. *Tents* open on all sides that comply with all of the following:
  - 2.1. Individual *tents* having a maximum size of 700 square feet (65 m<sup>2</sup>).
  - 2.2. The aggregate area of multiple *tents* placed side by side without a fire break clearance of 12 feet (3658 mm), not exceeding 700 square feet (65 m<sup>2</sup>) total.
  - 2.3. A minimum clearance of 12 feet (3658 mm) to all structures and other *tents*.
3. Funeral tents and curtains or extensions attached thereto, when used for funeral services.

**3103.3 Outdoor assembly event.** For the purposes of this chapter, an outdoor assembly event shall include a circus, carnival, tent show, theater, skating rink, dance hall or other place of assembly in or under which persons gather for any purpose.

**3103.3.1 Special amusement area.** *Tents* and other *membrane structures* erected as a special amusement area shall be equipped with an *automatic sprinkler system* in accordance with Section 914.7.1.

## TENTS, TEMPORARY SPECIAL EVENT STRUCTURES AND OTHER MEMBRANE STRUCTURES

**3103.4 Permits.** Permits shall be required as set forth in Sections 105.5 and 105.6.

**[W] 3103.5 Use period.** Temporary *tents*, air-supported, air-inflated or tensioned *membrane structures* (~~(shall not be)~~) are permitted to be erected for a period of ~~((more))~~ less than 180 days within a 12-month period on a single premises. Such structures erected for 180 days or more within a 12-month period shall comply with the *International Building Code*.

**[S] 3103.6 Construction documents.** A detailed site and floor plan for *tents* or *membrane structures* with an *occupant load* of 50 or more shall be provided with each application for approval. The *tent* or *membrane structure* floor plan shall indicate details of the *means of egress* facilities, seating capacity, arrangement of the seating and location and type of heating and electrical equipment. The *construction documents* shall include an analysis of structural stability, when required by the *fire code official*.

**3103.7 Inspections.** The entire *tent*, air-supported, air-inflated or tensioned *membrane structure* system shall be inspected at regular intervals, but not less than two times per permit use period, by the permittee, *owner* or agent to determine that the installation is maintained in accordance with this chapter.

**Exception:** Permit use periods of less than 30 days.

**3103.7.1 Inspection report.** Where required by the *fire code official*, an inspection report shall be provided and shall consist of maintenance, anchors and fabric inspections.

**3103.8 Access, location and parking.** Access, location and parking for temporary *tents* and *membrane structures* shall be in accordance with this section.

**3103.8.1 Access.** Fire apparatus access roads shall be provided in accordance with Section 503.

**3103.8.2 Location.** *Tents* or *membrane structures* shall not be located within 20 feet (6096 mm) of *lot lines*, buildings, other *tents* or *membrane structures*, parked vehicles or internal combustion engines. For the purpose of determining required distances, support ropes and guy wires shall be considered as part of the temporary *membrane structure* or *tent*.

### Exceptions:

1. Separation distance between *membrane structures* and *tents* not used for cooking is not required where the aggregate floor area does not exceed 15,000 square feet (1394 m<sup>2</sup>).
2. *Membrane structures* or *tents* need not be separated from buildings where all of the following conditions are met:
  - 2.1. The aggregate floor area of the *membrane structure* or *tent* shall not exceed 10,000 square feet (929 m<sup>2</sup>).
  - 2.2. The aggregate floor area of the building and *membrane structure* or *tent* shall not exceed the allowable floor area including increases as indicated in the *International Building Code*.
  - 2.3. Required *means of egress* are provided for both the building and the *membrane structure* or *tent* including travel distances.
  - 2.4. Fire apparatus access roads are provided in accordance with Section 503.

**3103.8.3 Location of structures in excess of 15,000 square feet in area.** *Membrane structures* having an area of 15,000 square feet (1394 m<sup>2</sup>) or more shall be located not less than 50 feet (15 240 mm) from any other *tent* or structure as measured from the sidewall of the *tent* or *membrane structure* unless joined together by a corridor.

**3103.8.4 Membrane structures on buildings.** *Membrane structures* that are erected on buildings, balconies, decks or other structures shall be regulated as permanent *membrane structures* in accordance with Section 3102 of the *International Building Code*.

**3103.8.5 Connecting corridors.** *Tents* or *membrane structures* are allowed to be joined together by means of corridors. *Exit* doors shall be provided at each end of such corridor. On each side of such corridor and approximately opposite each other, there shall be provided openings not less than 12 feet (3658 mm) wide.

**3103.8.6 Fire break.** An unobstructed fire break passageway or fire road not less than 12 feet (3658 mm) wide and free from guy ropes or other obstructions shall be maintained on all sides of all *tents* and *membrane structures* unless otherwise approved by the *fire code official*.

**[S] 3103.9 Structural stability and anchorage required.** *Tents* or *membrane structures* and their appurtenances shall be designed and installed to withstand the elements of weather and prevent collapsing. Documentation of structural stability shall be furnished to the *fire code official* on request.

**3103.9.1 Tents and membrane structures greater than one story.** *Tents* and *membrane structures* exceeding one story shall be designed and constructed to comply with Sections 1606 through 1609 of the *International Building Code*.

**3103.9.2 Tents and membrane structures greater than 7,500 square feet.** *Tents* and *membrane structures* greater than 7,500 square feet (697 m<sup>2</sup>) shall be designed and constructed to comply with Sections 1606 through 1609 of the *International Building Code*.

## TENTS, TEMPORARY SPECIAL EVENT STRUCTURES AND OTHER MEMBRANE STRUCTURES

2. In public areas, smooth-surfaced, unobstructed *aisles* having a minimum width of not less than 44 inches (1118 mm) shall be provided from seating areas, and *aisles* shall be progressively increased in width to provide, at all points, not less than 1 foot (305 mm) of *aisle* width for each 50 persons served by such *aisle* at that point.

**3103.12.5.1 Arrangement and maintenance.** The arrangement of *aisles* shall be subject to approval by the *fire code official* and shall be maintained clear at all times during occupancy.

**3103.12.6 Exit signs.** *Exits* shall be clearly marked. *Exit* signs shall be installed at required *exit* doorways and where otherwise necessary to indicate clearly the direction of egress where the *exit* serves an *occupant load* of 50 or more.

**3103.12.6.1 Exit sign illumination.** *Exit* signs shall be either *listed* and *labeled* in accordance with UL 924 as the internally illuminated type and used in accordance with the listing or shall be externally illuminated by luminaires supplied in either of the following manners:

1. Two separate circuits, one of which shall be separate from all other circuits, for *occupant loads* of 300 or less.
2. Two separate sources of power, one of which shall be an *approved* emergency system, shall be provided where the *occupant load* exceeds 300. Emergency systems shall be supplied from storage batteries or from the on-site generator set, and the system shall be installed in accordance with NFPA 70. The emergency system provided shall have a minimum duration of 90 minutes when operated at full design demand.

**3103.12.7 Means of egress illumination.** *Means of egress* shall be illuminated with light having an intensity of not less than 1 foot-candle (11 lux) at floor level while the structure is occupied. Fixtures required for *means of egress* illumination shall be supplied from a separate circuit or source of power.

**3103.12.8 Maintenance of means of egress.** The required width of *exits*, *aisles* and passageways shall be maintained at all times to a *public way*. Guy wires, guy ropes and other support members shall not cross a *means of egress* at a height of less than 8 feet (2438 mm). The surface of *means of egress* shall be maintained in an *approved* manner.

## SECTION 3104

### TEMPORARY AND PERMANENT TENTS AND MEMBRANE STRUCTURES

**3104.1 General.** *Tents* and *membrane structures*, both temporary and permanent, shall be in accordance with this section and Sections 3106 and 3107. Permanent *tents* and *membrane structures* shall also comply with the *International Building Code*.

**[S] 3104.2 Flame propagation performance testing and certification.** Before a permit is granted, the *owner* or agent shall file with the *fire code official* a certificate provided by the product manufacturer to verify that the materials have been tested and certified by an *approved* testing laboratory. The certificate shall indicate that the floor coverings, *tents*, *membrane structures* and their appurtenances, which include sidewalls, drops and tarpaulins, are composed of materials meeting the flame propagation performance of Test Method 2 of NFPA 701, or other approved standard. Additionally, it shall indicate that the bunting and combustible decorative materials and effects are composed of material meeting the flame propagation performance criteria of Test Method 1 or Test Method 2 of NFPA 701, or other approved standard as applicable. Alternatively, the materials shall be treated with a flame retardant in an *approved* manner and meet the flame propagation performance criteria of the applicable test method of NFPA 701, or other approved standard. The certificate shall indicate compliance with the testing requirements of NFPA 701, Chapter 16. The flame propagation performance criteria shall be effective for the period specified by the permit.

#### **3104.2 Point of Information**

Accepted flame certificates for decorative materials include:

1. Certificates indicating compliance with NFPA 701.
2. Certificates verifying approval through the California State Fire Marshal.
3. Certificates indicating compliance with CPAI-84 (Canvas Products Association International).

**3104.3 Label.** *Membrane structures* or *tents* shall have a permanently affixed label bearing the following information:

1. The identification of size and fabric or material.
2. The names and addresses of the manufacturers of the *tent* or air-supported structure.
3. A statement that the fabric or material meets the requirements of Section 3104.2.
4. If treated, the date the fabric or material was last treated with flame-retardant solution, the trade name or kind of chemical used in treatment, name of person or firm treating the fabric or material, and name of testing agency and test standard by which the fabric or material was tested.



## TENTS, TEMPORARY SPECIAL EVENT STRUCTURES AND OTHER MEMBRANE STRUCTURES

5. If untreated, a statement that no treatment was applied when the fabric or material met the requirements of Section 3104.2.

**3104.4 Affidavit.** The affidavit required by Section 3104.2 shall contain all of the information specified in Section 3104.3.

### SECTION 3105 TEMPORARY SPECIAL EVENT STRUCTURES

**3105.1 General.** Temporary special event structures shall comply with Section 3104, Sections 3105.2 through 3105.9 and ANSI E1.21.

**3105.2 Approval.** Temporary special event structures in excess of 400 square feet (37 m<sup>2</sup>) shall not be erected, operated or maintained for any purpose without first obtaining approval and a permit from the *fire code official* and the *building official*.

**3105.3 Permits.** Permits shall be required as set forth in Sections 105.5 and 105.6.

**3105.4 Use period.** Temporary special event structures erected in accordance with ANSI E1.21 shall not be erected for a period of more than six consecutive weeks.

**[S] 3105.5 Required documents.** The following documents shall be submitted to the *fire code official* (~~and the building official~~) for review before a permit is *approved*:

1. Construction documents: *Construction documents* shall be prepared by a *registered design professional* in accordance with the *International Building Code* and ANSI E1.21 where applicable. *Construction documents* shall include:
  - 1.1. A summary sheet showing the building code used, design criteria, loads and support reactions.
  - 1.2. Detailed construction and installation drawings.
  - 1.3. Design calculations.
  - 1.4. Operating limits of the structure explicitly outlined by the *registered design professional* including environmental conditions and physical forces.
  - 1.5. Effects of additive elements such as video walls, supported scenery, audio equipment, vertical and horizontal coverings.
  - 1.6. Means for adequate stability including specific requirements for guying and cross-bracing, ground anchors or ballast for different ground conditions.
2. Designation of responsible party: The *owner* of the temporary special event structure shall designate in writing a person to have responsibility for the temporary special event structure on the site. The designated person shall have sufficient knowledge of the construction documents, manufacturer's recommendations and operations plan to make judgments regarding the structure's safety and to coordinate with the *fire code official*.
3. Operations plan: The operations plan shall reflect manufacturer's operational guidelines, procedures for environmental monitoring and actions to be taken under specified conditions consistent with the *construction documents*.

**[S] 3105.6 Inspections.** Inspections shall comply with Section ~~((106))~~ 107 and ~~((Sections 3105.6.1 and 3105.6.2))~~ as required by the fire code official.

~~((3105.6.1 Independent inspector. The owner of a temporary special event structure shall employ a qualified, independent approved agency or individual to inspect the installation of a temporary special event structure.~~

~~3105.6.2 Inspection report. The inspecting agency or individual shall furnish an inspection report to the fire code official. The inspection report shall indicate that the temporary special event structure was inspected and was or was not installed in accordance with the approved construction documents. Discrepancies shall be brought to the immediate attention of the installer for correction. Where any discrepancy is not corrected, it shall be brought to the attention of the fire code official and the designated responsible party.))~~

**3105.7 Means of egress.** The *means of egress* for temporary special event structures shall comply with Chapter 10.

**3105.8 Location.** Temporary special event structure shall be located a distance from property lines and buildings to accommodate distances indicated in the construction drawings for guy wires, cross-bracing, ground anchors or ballast. Location shall not interfere with egress from a building or encroach on fire apparatus access roads.

**3105.9 Portable fire extinguishers.** Portable fire extinguishers shall be provided as required by Section 906.

### SECTION 3106 OUTDOOR ASSEMBLY EVENTS

**3106.1 Scope.** Outdoor assembly events shall comply with this section.

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**3106.6.2 Generators.** Generators shall be installed not less than 10 feet (3048 mm) from combustible materials, and shall be isolated from the public by physical guard, fence or enclosure installed not less than 3 feet (914 mm) away from the internal combustion power source.

**3106.6.3 Portable fire extinguishers.** Each generator shall be provided with an *approved* portable fire extinguisher complying with Section 906.

### SECTION 3107 OPERATIONAL REQUIREMENTS

**3107.1 General.** Temporary and permanent *tents* and *membrane structures* shall comply with this section.

**3107.2 Combustible materials.** Hay, straw, shavings or similar combustible materials shall not be located within any *tent* or *membrane structure* containing an assembly occupancy, except the materials necessary for the daily feeding and care of animals. Sawdust and shavings utilized for a public performance or exhibit shall not be prohibited provided that the sawdust and shavings are kept damp. Combustible materials shall not be permitted under stands or seats at any time.

**3107.3 Smoking.** Smoking shall not be permitted in *tents* or *membrane structures*. *Approved* “No Smoking” signs shall be conspicuously posted in accordance with Section 310.

**3107.4 Open or exposed flame.** Open flame or other devices emitting flame, fire or heat or any *flammable* or *combustible liquids*, gas, charcoal or other cooking device or any other unapproved devices shall not be permitted inside or located within 20 feet (6096 mm) of the *tent* or *membrane structures* while open to the public unless *approved* by the *fire code official*.

**3107.5 Fireworks.** Fireworks shall not be used within 100 feet (30 480 mm) of *tents* or *membrane structures*.

**3107.6 Spot lighting.** Spot or effect lighting shall only be by electricity, and all combustible construction located within 6 feet (1829 mm) of such equipment shall be protected with *approved* noncombustible insulation not less than 9-1/4 inches (235 mm) thick.

**3107.7 Safety film.** Motion pictures shall not be displayed in *tents* or *membrane structures* unless the motion picture film is safety film.

**[S] 3107.8 Clearance.** (~~There~~) Where required by the *fire code official*, there shall be a clearance of not less than 3 feet (914 mm) between the fabric envelope and all contents located inside *membrane structures*.

**3107.9 Portable fire extinguishers.** *Approved* portable fire extinguishers complying with Section 906 shall be provided and placed in locations as required by the *fire code official*.

**3107.10 Fire protection equipment.** Fire hose lines, water supplies and other auxiliary fire equipment shall be maintained at the site in such numbers and sizes as required by the *fire code official*.

**3107.11 Occupant load factors.** The *occupant load* allowed in an assembly structure, or portion thereof, shall be determined in accordance with Chapter 10.

**3107.12 Heating and cooking equipment.** Heating and cooking equipment shall be in accordance with Sections 3107.12.1 through 3107.12.7.

**3107.12.1 Installation.** Heating or cooking equipment, tanks, piping, hoses, fittings, valves, tubing and other related components shall be installed as specified in the *International Fuel Gas Code* and the *International Mechanical Code*, and shall be *approved* by the *fire code official*.

**3107.12.2 Venting.** Gas, liquid and solid fuel-burning equipment designed to be vented shall be vented to the outside air as specified in the *International Fuel Gas Code* and the *International Mechanical Code*. Such vents shall be equipped with *approved* spark arresters where required. Where vents or flues are used, all portions of the *tent* or *membrane structure* shall be not less than 12 inches (305 mm) from the flue or vent.

**3107.12.3 Location.** Cooking and heating equipment shall not be located within 10 feet (3048 mm) of *exits* or combustible materials.

**3107.12.4 Operations.** Operations such as warming of foods, cooking demonstrations and similar operations that use solid flammables, butane or other similar devices that do not pose an ignition hazard, shall be *approved*.

**[S] 3107.12.5 Cooking tents.** (~~Tents~~) Where required by the *fire code official*, tents with sidewalls or drops where cooking is performed shall be separated from other *tents* or *membrane structures* by not less than 20 feet (6096 mm).

**[S] 3107.12.6 Outdoor cooking.** (~~Outdoor~~) Where required by the *fire code official*, outdoor cooking that produces sparks or grease-laden vapors shall not be performed within 20 feet (6096 mm) of a *tent* or *membrane structure*.

**3107.12.7 Electrical heating and cooking equipment.** Electrical cooking and heating equipment shall comply with NFPA 70.

## TENTS, TEMPORARY SPECIAL EVENT STRUCTURES AND OTHER MEMBRANE STRUCTURES

**3107.13 LP-gas.** The storage, handling and use of LP-gas and LP-gas equipment shall be in accordance with Sections 3107.13.1 through 3107.13.3.

**3107.13.1 General.** LP-gas equipment such as containers, tanks, piping, hoses, fittings, valves, tubing and other related components shall be *approved* and in accordance with Chapter 61 and with the *International Fuel Gas Code*.

**3107.13.2 Location of containers.** LP-gas containers and tanks shall be located outside in accordance with Table 6104.3. Pressure relief devices shall be pointed away from the *tent* or *membrane structure*.

**3107.13.3 Protection and security.** Portable LP-gas containers, tanks, piping, valves and fittings that are located outside and are being used to fuel equipment inside a *tent* or *membrane structure* shall be adequately protected to prevent tampering, damage by vehicles or other hazards and shall be located in an *approved* location. Portable LP-gas containers shall be secured to prevent unauthorized movement.

**3107.14 Flammable and combustible liquids.** The storage of *flammable* and *combustible liquids* and the use of flammable-liquid-fueled equipment shall be in accordance with Sections 3107.14.1 through 3107.14.3.

**3107.14.1 Use.** Flammable-liquid-fueled equipment shall not be used in *tents* or *membrane structures*.

[S] **3107.14.2 Flammable and combustible liquid storage.** (~~Flammable~~) Where required by the fire code official, flammable and combustible liquids shall be stored outside in an approved manner not less than 50 feet (15 240 mm) from tents or membrane structures. Storage shall be in accordance with Chapter 57.

[S] **3107.14.3 Refueling.** (~~Refueling~~) Where required by the fire code official, refueling shall be performed in an approved location not less than 20 feet (6096 mm) from tents or membrane structures.

**3107.15 Display of motor vehicles.** Liquid- and gas-fueled vehicles and equipment used for display within *tents* or *membrane structures* shall be in accordance with Sections 3107.15.1 through 3107.15.5.3.

**3107.15.1 Batteries.** Batteries shall be disconnected except where the *fire code official* requires that the batteries remain connected to maintain safety features.

**3107.15.2 Fuel.** Vehicles or equipment shall not be fueled or defueled within the *tent* or *membrane structure*.

[S] **3107.15.2.1 Quantity limit.** Fuel in the fuel tanks shall not exceed any of the following: Class I, II, and III liquid fuel does not exceed one-quarter of the tank capacity or 5 gallons (19 L), whichever is less; LP-gas does not exceed one-quarter tank or 6.5 gallons (25 L), whichever is less; CNG does not exceed one-quarter tank or 630 cubic feet (17.8 m<sup>3</sup>), whichever is less; or hydrogen does not exceed one-quarter tank or 2,000 cubic feet (57 m<sup>3</sup>), whichever is less.

**3107.15.2.2 Inspection.** Fuel systems shall be inspected for leaks.

**3107.15.2.3 Closure.** Fuel tank openings shall be locked and sealed to prevent the escape of vapors.

**3107.15.3 Location.** The location of vehicles or equipment shall not obstruct *means of egress*.

**3107.15.4 Places of assembly.** When a compressed natural gas (CNG) or liquefied petroleum gas (LP-gas) powered vehicle is parked inside a place of assembly, all of the following conditions shall be met:

1. The quarter-turn shutoff valve or other shutoff valve on the outlet of the CNG or LP-gas container shall be closed and the engine shall be operated until it stops. Valves shall remain closed while the vehicle is indoors.
2. The hot lead of the battery shall be disconnected.
3. Dual-fuel vehicles equipped to operate on gasoline and CNG or LP-gas shall comply with this section and Sections 3107.15.1 through 3107.15.3 for gasoline-powered vehicles.

**3107.15.5 Competitions and demonstrations.** Liquid- and gas-fueled vehicles and equipment used for competition or demonstration within a *tent* or *membrane structure* shall comply with Sections 3107.15.5.1 through 3107.15.5.3.

**3107.15.5.1 Fuel storage.** Fuel for vehicles or equipment shall be stored in *approved* containers in an *approved* location outside of the structure in accordance with Section 3107.14.2.

**3107.15.5.2 Fueling.** Refueling shall be performed outside of the structure in accordance with Section 3107.14.3.

**3107.15.5.3 Spills.** Fuel spills shall be cleaned up immediately.

[S] **3107.16 Separation of generators.** (~~Generators~~) Where required by the fire code official, generators and other internal combustion power sources shall be separated from tents or membrane structures by not less than 20 feet (6096 mm) and shall be isolated from contact with the public by fencing, enclosure or other approved means.

**3107.17 Standby personnel.** Where, in the opinion of the *fire code official*, it is essential for public safety in a *tent* or *membrane structure* used as a place of assembly or any other use where people congregate, because of the number of persons, or the nature of the performance, exhibition, display, contest or activity, the *owner*, agent or lessee shall employ one or more qualified persons, as required and *approved*, to remain on duty during the times such places are open to the public, or when such activity is being conducted.

## HIGH-PILED COMBUSTIBLE STORAGE

2. Design storage height for each storage area.
3. Types of commodities.
4. Commodity clearance between top of storage and the sprinkler deflector for each storage arrangement.
5. Aisle dimensions between each storage array.
6. For palletized and solid-piled storage, the maximum pile volume for each storage array.
7. Location and classification of commodities in accordance with Section 3203.
8. Location of required fire department access doors.
9. Location of valves controlling the water supply of ceiling and in-rack sprinklers.

[S] **3201.4 Fire safety and evacuation plan.** Where required by the Section 403, a fire safety and evacuation plan shall be submitted at the time of permit application for review and approval by the fire code official. A copy of the *approved* fire safety and evacuation plan shall be maintained on the premises in an *approved* location.

## SECTION 3202 DEFINITIONS

**3202.1 Definitions.** The following terms are defined in Chapter 2:

**ARRAY.**

**ARRAY, CLOSED.**

**AUTOMATED RACK STORAGE.**

**BIN BOX.**

**COMMODITY.**

**EARLY SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER.**

**EXPANDED PLASTIC.**

**EXTRA-HIGH-RACK COMBUSTIBLE STORAGE.**

**HIGH-PILED COMBUSTIBLE STORAGE.**

**HIGH-PILED STORAGE AREA.**

**LONGITUDINAL FLUE SPACE.**

**MANUAL STOCKING METHODS.**

**MECHANICAL STOCKING METHODS.**

**SHELF STORAGE.**

**SOLID SHELVING.**

**TRANSVERSE FLUE SPACE.**

## SECTION 3203 COMMODITY CLASSIFICATION

**3203.1 Classification of commodities.** Commodities shall be classified as Class I, II, III, IV or high hazard in accordance with Sections 3203.2 through 3203.10.3. Materials listed within each commodity classification are assumed to be unmodified for improved combustibility characteristics. Use of flame-retarding modifiers or the physical form of the material could change the classification.

**3203.2 Class I commodities.** Class I commodities are noncombustible products in ordinary corrugated cartons with or without single-thickness dividers, or in ordinary paper wrappings with or without wood pallets. The amount of Group A plastics shall be limited in accordance with Section 3203.9.

**3203.3 Class II commodities.** Class II commodities are Class I products in slatted wooden crates, solid wooden boxes, multiple-thickness paperboard cartons or equivalent combustible packaging material with or without wood pallets. The amount of Group A plastics shall be limited in accordance with Section 3203.9.

**3203.4 Class III commodities.** Class III commodities are products of wood, paper, natural fiber cloth, or Group C plastics or products thereof, with or without wood pallets. The amount of Group A plastics shall be limited in accordance with Section 3203.9.

FIRE DEPARTMENT ACCESS DOOR  
DO NOT BLOCK

The lettering shall be in a contrasting color to the background. Letters shall have a minimum height of 2 inches (51 mm) with a minimum stroke of 3/8 inch (10 mm).

**3206.7.5 Number of doors required.** The required fire department access doors shall be distributed such that the lineal distance between adjacent fire department access doors does not exceed 125 feet (38 100 mm) measured center to center.

**Exception:** The linear distance between adjacent access doors shall not exceed 200 feet (60 960 mm) in existing buildings where change in occupancy is not proposed.

**3206.7.6 Door size and type.** Fire department access doors shall be not less than 3 feet (914 mm) in width and 6 feet 8 inches (2032 mm) in height. Roll-up doors shall not be considered fire department access doors unless *approved*.

**3206.7.7 Locking devices.** Locking devices on fire department access doors shall be *approved*.

**[S] 3206.7.8 Key box.** Where fire department access doors are required, the fire code official may require a key box (~~shall~~) to be installed in accordance with Section 506.1. The key box shall contain keys or devices to allow for entry through the fire department access doors.

**3206.8 Smoke and heat removal.** Where smoke and heat removal is required by Table 3206.2 it shall be provided in accordance with Section 910.

**3206.9 Fire department hose connections.** Where exit *passageways* are required by the *International Building Code* for egress, a Class I standpipe system shall be provided in accordance with Section 905.

**3206.10 Aisles.** Aisles providing access to *exits* and fire department access doors shall be provided in *high-piled storage areas* exceeding 500 square feet (46 m<sup>2</sup>), in accordance with Sections 3206.10.1 through 3206.10.3. Aisles separating storage piles or racks shall comply with NFPA 13. Aisles shall comply with Chapter 10.

**Exception:** Where aisles are precluded by rack storage systems, alternate methods of access and protection are allowed where *approved*.

**3206.10.1 Width.** Aisle width shall be in accordance with Sections 3206.10.1.1 and 3206.10.1.2.

**Exceptions:**

1. Aisles crossing rack structures or storage piles, that are used only for employee access, shall be not less than 24 inches (610 mm) wide.
2. Aisles separating shelves classified as shelf storage shall be not less than 30 inches (762 mm) wide.

**3206.10.1.1 Sprinklered buildings.** Aisles in sprinklered buildings shall be not less than 44 inches (1118 mm) wide. Aisles shall be not less than 96 inches (2438 mm) wide in *high-piled storage areas* exceeding 2,500 square feet (232 m<sup>2</sup>) in area, that are accessible to the public and designated to contain high-hazard commodities.

Aisles shall be not less than 96 inches (2438 mm) wide in areas open to the public where mechanical stocking methods are used.

**Exceptions:**

1. Aisles in *high-piled storage areas* exceeding 2,500 square feet (232 m<sup>2</sup>) in area, that are open to the public and designated to contain high-hazard commodities, and that are protected by a sprinkler system designed for multiple-row racks of high-hazard commodities, shall be not less than 44 inches (1118 mm) wide.
2. Aisles that are in *high-piled storage areas* exceeding 2,500 square feet (232 m<sup>2</sup>) in area, not open to the public and protected by a sprinkler system designed for multiple-row racks, shall be not less than 24 inches (610 mm) wide.

**3206.10.1.2 Nonsprinklered buildings.** Aisles in nonsprinklered buildings shall be not less than 96 inches (2438 mm) wide.

**3206.10.2 Clear height.** The required aisle width shall extend from floor to ceiling. Rack structural supports and catwalks are allowed to cross aisles at a minimum height of 6 feet 8 inches (2032 mm) above the finished floor level, provided that such supports do not interfere with fire department hose stream trajectory.

**3206.10.3 Dead-end aisles.** Dead-end aisles shall not exceed 20 feet (6096 mm) in length in Group M occupancies. Dead-end aisles shall not exceed 50 feet (15 240 mm) in length in all other occupancies.

**Exception:** Dead-end aisles are not limited where the length of the dead-end aisle is less than 2.5 times the least width of the dead-end aisle.

**3206.11 Portable fire extinguishers.** Portable fire extinguishers shall be provided in accordance with Section 906.

## CHAPTER 33

# FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

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**User note:**

**About this chapter:** Chapter 33 outlines general fire safety precautions for all structures and all occupancies during construction and demolition operations. In general, these requirements seek to maintain required levels of fire protection, limit fire spread, establish the appropriate operation of equipment and promote prompt response to fire emergencies. There is an emphasis on owner responsibility and the need to create and implement a site safety plan. Features regulated include fire protection systems, fire fighter access to the site and building, water supply, means of egress, hazardous materials storage and use, and temporary heating equipment and other ignition sources. Fire watches are an important component of this chapter. This chapter correlates with Chapter 33 of the International Building Code®.

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### SECTION 3301 GENERAL

[S] **3301.1 Scope.** This chapter shall apply to structures in the course of construction, *alteration* or demolition, including those in underground locations. Compliance with NFPA 241 is required for items not specifically addressed herein.

Construction, alteration and demolition of fixed guideway transit and passenger rail system tunnels shall comply with NFPA 130 as amended and WAC 296-155, Part Q, Underground Construction.

Construction, alteration and demolition of road tunnels shall comply with NFPA 502 as amended and WAC 296-155, Part Q, Underground Construction.

**3301.2 Purpose.** This chapter prescribes minimum safeguards for construction, *alteration* and demolition operations to provide reasonable safety to life and property from fire during such operations.

[S] 3301.3 Alterations and additions. Required exits, existing structural elements, and fire protection devices shall be maintained at all times during alterations, repairs or additions to any building or structure.

**Exceptions:**

1. When such required elements or devices are being altered, adequate substitute provisions shall be made.
2. Maintenance of such elements and devices is not required when the building is not occupied.

### SECTION 3302 DEFINITIONS

[S] **3302.1 Terms defined in Chapter 2.** Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.

**ADDITION.**

**ALTERATION.**

**CHANGE OF OCCUPANCY**

**EXISTING BUILDING, EXISTING STRUCTURE.**

**REHABILITATION.**

**REPAIR.**

**SUBSTANTIAL ALTERATION.**

### [W] SECTION 3303 ~~((OWNER'S RESPONSIBILITY FOR FIRE PROTECTION))~~ **ADMINISTRATIVE SAFETY CONTROLS**

[W] **3303.1 Program development and maintenance.** The *owner* or *owner's* authorized agent shall be responsible for the development, implementation and maintenance of an *approved*, written *site safety plan* establishing a fire prevention program at the project site applicable throughout all phases of the construction, repair, *alteration* or demolition work. The plan addresses the requirements of this chapter and other applicable portions of this code, the duties of staff and staff training requirements. The plan shall be submitted and *approved* before a building permit is issued. Any changes to the plan shall be submitted for approval.

## FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

**3303.1.1 Components of site safety plans.** *Site safety plans* shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where *approved*, and signage locations in accordance with Section ~~((3305.8))~~ 3305.7.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of *flammable* and *combustible liquids* and other hazardous materials.
11. Provisions for site security.
12. Changes that affect this plan.
13. Other site-specific information required by the *fire code official*.

**[S] 3303.2 Site safety director.** The *owner* shall designate a person to be the site safety director. The site safety director shall be responsible for ensuring compliance with the *site safety plan*. The site safety director shall have the authority to enforce the provisions of this chapter and other provisions as necessary to secure the intent of this chapter. ~~((Where guard service is provided in accordance with NFPA 241, the site safety director shall be responsible for the guard service.))~~

**[W] ~~((3303.6))~~ 3303.2.1 Training.** Training of fire watch and other responsible personnel in the use of fire protection equipment shall be the responsibility of the site safety director. Records of training shall be kept and made a part of the written plan for the *site safety plan*.

**[W] 3303.3 Daily fire safety inspection.** The site safety director shall be responsible for completion of a daily fire safety inspection at the project site. Each day, all building and outdoor areas shall be inspected to ensure compliance with the inspection list in this section. The results of each inspection shall be documented and maintained on-site until a certificate of occupancy has been issued. Documentation shall be immediately available on-site for presentation to the *fire code official* upon request.

1. Any contractors entering the site to perform hot work each day have been instructed in the hot work safety requirements in Chapter 35, and hot work is performed only in areas *approved* by the site safety director.
2. Temporary heating equipment is maintained away from combustible materials in accordance with the equipment manufacturer's instructions.
3. Combustible debris, rubbish and waste material is removed from the building in areas where work is not being performed.
4. Temporary wiring does not have exposed conductors.
5. *Flammable liquids* and other hazardous materials are stored in locations that have been *approved* by the site safety director when not involved in work that is being performed.
6. Fire apparatus access roads required by Section ~~((3314))~~ 3307 are maintained clear of obstructions that reduce the width of the usable roadway to less than 20 feet (6096 mm).
7. Fire hydrants are clearly visible from access roads and are not obstructed.
8. The location of fire department connections to standpipe and in-service sprinkler systems are clearly identifiable from the access road and such connections are not obstructed.
9. Standpipe systems are in service and continuous to the highest work floor, as specified in Section ~~((3314.1))~~ 3307.5.
10. Portable fire extinguishers are available in locations required by Sections ~~((3316))~~ 3306.6 and ~~((3318.3))~~ 3305.10.2.

**3303.3.1 Violations.** Failure to properly conduct, document and maintain documentation required by this section shall constitute an unlawful act in accordance with Section 112.1 and shall result in the issuance of a notice of violation to the site safety director in accordance with Section 112.3. Upon the third offense, the *fire code official* is authorized to issue a stop work order in accordance with Section 113, and work shall not resume until satisfactory assurances of future compliance have been presented to and *approved* by the *fire code official*.

**3303.4 Qualifications.** Site safety directors shall acquire training specific to their roles and responsibilities. Upon request, the training and qualifications of the site safety director shall be submitted to the *fire code official* for approval.

[W] (~~3305.5~~) **3303.5 Fire watch.** Where required by the *fire code official* or the *site safety plan* established in accordance with Section 3303.1, a fire watch shall be provided for building demolition and for building construction.

**EXCEPTION:** New construction that is built under the IRC.

[W] (~~3305.5.1~~) **3303.5.1 Fire watch during construction.** A fire watch shall be provided during nonworking hours for new construction that exceeds 40 feet (12 192 mm) in height above the lowest adjacent grade at any point along the building perimeter, for new multistory construction with an aggregate area exceeding 50,000 square feet (4645 m<sup>2</sup>) per story or as required by the *fire code official*.

[W] (~~3305.5.2~~) **3303.5.2 Fire watch personnel.** Fire watch personnel shall be provided in accordance with this section.

[W][S] (~~3305.5.2.1~~) **3303.5.2.1 Duties.** The primary duty of fire watch personnel shall be to perform constant patrols and watch for the occurrence of fire, extinguishing spot or incipient phase fires and communicating an alarm. The combination of fire watch duties and site security duties is acceptable.

[W] (~~3305.5.2.2~~) **3303.5.2.2 Training.** Personnel shall be trained to serve as an on-site fire watch. Training shall include the use of portable fire extinguishers. Fire extinguishers and fire reporting shall be in accordance with Sections (~~3340~~) 3303.6 and 3306.6.

[W] (~~3305.5.2.3~~) **3303.5.2.3 Means of notification.** Fire watch personnel shall be provided with not fewer than one *approved* means for notifying the fire department.

[W] (~~3305.5.3~~) **3303.5.3 Fire watch location and records.** The fire watch shall include areas specified by the *site safety plan* established in accordance with Section 3303.

[W] (~~3305.5.4~~) **3303.5.4 Fire watch records.** Fire watch personnel shall keep a record of all time periods of duty, including the log entry for each time the site was patrolled and each time a structure was entered and inspected. Records shall be made available for review by the *fire code official* upon request.

[W] (~~3310.1~~) **3303.6 Emergency telephone.** Emergency telephone facilities with *ready access* shall be provided in an *approved* location at the construction site, or an *approved* equivalent means of communication shall be provided. The street address of the construction site and the emergency telephone number of the fire department shall be posted adjacent to the telephone. Alternatively, where an equivalent means of communication has been *approved*, the site address and fire department emergency telephone number shall be posted at the main entrance to the site, in guard shacks and in the construction site office.

[S] **3303.7.** A fire watch shall be provided during hot work activities and shall continue for a minimum of 30 minutes after the conclusion of the work. The fire prevention program superintendent is authorized to extend the fire watch based on the hazards or work being performed.

**Exception:** Where the hot work area has no fire hazards or combustible exposures.

[S] **3303.7.1.** A fire watch shall be posted for the duration of the work and for 2 hours thereafter for torch-applied roofing operations.

[S] **3303.7.2.** The fire watch shall include the entire hot work area. Hot work conducted in areas with vertical or horizontal fire exposures that are not observable by a single individual shall have additional personnel assigned to fire watches to ensure that exposed areas are monitored.

[S] **3303.7.3.** Individuals designated to fire watch duty shall have fire-extinguishing equipment readily available and shall be trained in the use of such equipment.

[S] **3303.7.4.** The individuals responsible for performing hot work and individuals responsible for providing the fire watch shall be trained in the use of portable fire extinguishers.

[S] **3303.8 Site security.** Guard service and/or security fences shall be provided where required by the *fire code official*.

[S] **3303.8.1.** Where guard service is provided, the guard(s) shall be trained in all of the following:

1. Notification procedures that include calling the fire department and management personnel.
2. Function and operation of fire protection equipment.
3. Familiarization with fire hazards.
4. Use of construction elevators, where provided.
5. Any special status of emergency equipment or hazards.

[S] **3303.8.2.** Where guard service is provided, the fire prevention program superintendent shall be responsible for the guard service.

[S] **3303.8.3.** Entrances (e.g., doors and windows) to the structure under construction, alteration, or demolition shall be secured where required by the *fire code official*.



FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

[W] SECTION 3304  
~~((TEMPORARY HEATING EQUIPMENT))~~ **PROTECTION OF COMBUSTIBLE MATERIALS**

[W] ~~((3305.2))~~ **3304.1 Combustible debris, rubbish and waste.** Combustible debris, rubbish and waste material shall comply with the requirements of Sections ~~((3305.2.1 through 3305.2.4))~~ 3304.1.1 through 3304.2.

[W] ~~((3305.2.1))~~ **3304.1.1 Combustible waste material accumulation.** Combustible debris, rubbish and waste material shall not be accumulated within buildings.

[W] ~~((3305.2.2))~~ **3304.1.2 Combustible waste material removal.** Combustible debris, rubbish and waste material shall be removed from buildings at the end of each shift of work.

[W][S] ~~((3305.2.3))~~ **3304.1.3 Rubbish containers.** ~~((Where rubbish))~~ Rubbish containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m<sup>3</sup>) ~~((are))~~ used for temporary storage of combustible debris, rubbish and waste material ~~((; they))~~ shall have tight-fitting or self-closing lids. Such rubbish containers and lids shall be constructed entirely of materials that comply with either of the following:

1. Noncombustible materials.
2. Materials that meet a peak rate of heat release not exceeding 300 kW/m<sup>2</sup> when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m<sup>2</sup> in the horizontal orientation.

**Exceptions:**

1. Wastebaskets complying with Section 808.
2. Waste accumulated for collection by the City's solid waste utility shall be stored in containers (to include recycling containers) specified in the City's solid waste collection contracts authorized by ordinance.
3. Containers in areas protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.

[W][S] ~~((3305.2.4))~~ **3304.2 Spontaneous ignition.** Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container. Contents of such containers shall be removed and disposed of daily.

[S] **3304.3 Trash chutes.** Trash chutes used on the exterior of a building shall be of noncombustible construction, or shall be protected in accordance with the following, if of combustible construction:

1. The interior of combustible trash chutes shall be provided with not less than one temporary automatic sprinkler within a recess near the top of the chute.
2. The temporary sprinkler shall be protected by the recess as well as a listed sprinkler guard.
3. The temporary sprinkler shall be connected to any available water supply with a listed fire hose, or a flexible, commercial rubber hose, with a diameter of not less than 3/4 inch (19 mm) and a listed flexible connector.
4. The temporary sprinkler shall be protected against freezing where required by the fire code official.

[W] SECTION 3305  
~~((PRECAUTIONS AGAINST FIRE))~~ **IGNITION SOURCE CONTROLS**

[W] ~~((3304.1))~~ **3305.1 Listed.** Temporary heating devices shall be *listed* and *labeled*. The installation, maintenance and use of temporary heating devices shall be in accordance with the listing and the manufacturer's instructions.

[W] ~~((3304.2))~~ **3305.1.1 Oil-fired heaters.** Oil-fired heaters shall comply with Section 605.

[W] ~~((3304.3))~~ **3305.1.2 LP-gas heaters.** Fuel supplies for liquefied-petroleum gas-fired heaters shall comply with Chapter 61 and the *International Fuel Gas Code*.

[S] **3305.1.2.1.** LP-gas containers are allowed to be used in buildings or areas of buildings under construction or undergoing alterations as set comply with this section.

[S] **3305.1.2.2.** LPG cylinders, equipment, piping, and appliances shall comply with NFPA 58.

[S] **3305.1.2.3.** LPG cylinders used and transported for temporary heating in buildings or structures under construction or undergoing substantial alteration, and such buildings are not occupied by the public, shall comply with the following:

1. Liquefied-petroleum gas (LPG) fired heaters used for temporary heating in buildings under construction or undergoing substantial alteration shall be located at least 6 feet (1.8 m) from any LPG cylinder.

Exception: Integral heater-cylinder units specifically designed for the attachment of the heater to the cylinder, or to a supporting standard attached to the cylinder, and designed and installed to prevent direct or radiant heat application to the cylinder shall be exempt from the spacing requirement above.

2. Blower-type and radiant-type units shall not be directed toward any cylinder within 20 feet (6.1 m).

3. If two or more heater-cylinder units of either the integral or non-integral type are located in an unpartitioned area on the same floor, the cylinder(s) of each such unit shall be separated from the cylinder(s) of any other such unit by at least 20 feet (6.1 m).
4. If heaters are connected to cylinders manifolded together for use in an unpartitioned area on the same floor, the total water capacity of cylinders manifolded together serving any one heater shall not be greater than 735 lb (333 kg) [nominal 300 lb (136 kg) propane capacity]. If there is more than one such manifold, it shall be separated from any other by at least 20 feet (6.1 m).
5. Where cylinders are manifolded together for connection to a heater(s) on another floor, the following shall apply:
  - a. Heaters shall not be installed on the same floors with manifolded cylinders.
  - b. The total water capacity of the cylinders connected to any one manifold shall not be greater than 2,450 lb (1111 kg) [nominal 1,000 lb (454 kg) propane capacity].
  - c. Manifolds of more than 735 lb (333 kg) water capacity [nominal 300 lb (136 kg) propane capacity], if located in the same unpartitioned area, shall be separated from each other by at least 50 feet (15 m).

**[S] 3305.1.3.** The use and transportation of LPG cylinders in the unoccupied portions of buildings or structures under construction or undergoing substantial alteration that are partially occupied by the public shall be *approved* by the *fire code official*.

**[S] 3305.1.4.** Cylinders used and transported for repair or minor renovation in buildings frequented by the public during the hours the public normally occupies the building shall comply with the following:

1. The maximum water capacity of individual cylinders shall be 50 lb (23 kg) [nominal 20 lb (9.1 kg) propane capacity], and the number of cylinders in the building shall not exceed the number of workers assigned to the use of the propane.
2. Cylinders having a water capacity greater than 2.7 lb (1.2 kg) shall not be left unattended.

**[S] 3305.1.5.** During the hours the building is not open to the public, cylinders used and transported within the building for repair or minor renovation and with a water capacity greater than 2.7 lb (1.2 kg) shall not be left unattended.

**[S] 3305.1.6.** Portable heaters, including salamanders, shall comply with the following:

1. Portable heaters shall be equipped with an *approved* automatic device to shut off the flow of gas to the main burner and to the pilot, if used, in the event of flame extinguishment or combustion failure.
2. Portable heaters shall be self-supporting unless designed for cylinder mounting.
3. Portable heaters shall not be installed utilizing cylinder valves, connectors, regulators, manifolds, piping, or tubing as structural supports.
4. Portable heaters having an input of more than 50 000 Btu/hr (53 MJ/hr) shall be equipped with either a pilot that must be lighted and proved before the main burner can be turned on or an *approved* electric ignition system.

**Exception:** Portable heaters with less than 7,500 Btu/hr (8 MJ/hr) input if used with cylinders having a maximum water capacity of 2.7 lb (1.2 kg) and filled with not more than 16.8 oz (0.522 kg) of LP-gas.

**[S] 3305.1.7 LP-gas storage.** LP-gas cylinders not connected for use shall be stored outside of buildings in locked, ventilated metal cabinets or other *approved* enclosures located in accordance with Table 6109.12.

**[S] 3305.1.7.1 Alternative location and protection of storage.** Where the provisions of Section 3305.1.7 are impractical at construction sites, or at buildings or structures undergoing major renovation or repairs, the storage of containers shall be as required by the *fire code official*.

**[S] 3305.1.8 Fire District prohibition.** Storage and use of LP-gas containers having an individual capacity in excess of 239 pounds (108.4 kg) water capacity [nominal 100 pounds (48.3 kg) LP-gas] and all stationary installations are prohibited in the *Fire District*.

**[W][S] ((3304.4)) 3305.1.9 Refueling.** Refueling operations for liquid-fueled equipment or appliances shall be conducted in accordance with Section 5705. The equipment or appliance shall be shut down and allowed to cool prior to refueling.

**[W][S] ((3304.5)) 3305.1.10 Installation.** Clearance to combustibles from temporary heating devices shall be maintained in accordance with the *labeled* equipment. When in operation, temporary heating devices shall be fixed in place and protected from damage, dislodgement or overturning in accordance with the manufacturer's instructions.

**[W][S] ((3304.6)) 3305.1.11 Supervision.** The use of temporary heating devices shall be supervised and maintained only by competent personnel.

**[W] ((3305.1)) 3305.2 Smoking.** Smoking shall be prohibited except in *approved* areas. Signs shall be posted in accordance with Section 310. In *approved* areas where smoking is permitted, *approved* ashtrays shall be provided in accordance with Section 310.

## FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

[S] **3305.3 Burning of combustible debris, rubbish and waste.** Combustible debris, rubbish and waste material shall not be disposed of by burning on the site. ~~((unless approved.))~~

[S] **3305.4 Open burning.** ~~Open burning ((shall comply with Section 307))~~ is prohibited in Seattle.

[W][S] ~~((3305.6 Cutting and welding))~~ **3305.5 Hot work.** Welding, cutting, open torches and other hot work operations and equipment shall comply with Chapter 35.

[S] **3305.5.1.** Hot work shall only be conducted in areas designed or authorized for that purpose by the fire prevention program superintendent.

[S] **3305.5.2.** Hot work shall not be conducted in the following areas unless approval has been obtained from the *fire code official*:

1. Areas where the sprinkler system is impaired.
2. Areas where there exists the potential of an explosive atmosphere, such as locations where flammable gases, liquids or vapors are present.
3. Areas with readily ignitable materials, such as storage of large quantities of bulk sulfur, baled paper, cotton, lint, dust or loose combustible materials.

[S] **3305.5.3.** Portable LP-gas containers are allowed to be used to supply *approved* self-contained torch assemblies or similar appliances. Such containers shall not exceed a water capacity of 2 1/2 pounds (1 kg).

[W] ~~((3305.7))~~ **3305.6 Electrical.** Temporary wiring for electrical power and lighting installations used in connection with the construction, *alteration* or demolition of buildings, structures, equipment or similar activities shall comply with NFPA 70.

[S] **3305.6.1.** All temporary branch circuits shall originate in an *approved* power outlet or panelboard. Conductors shall be permitted within multi-conductor cord or cable assemblies or as open conductors. All conductors shall be protected by overcurrent devices rated for the ampacity of the conductors. Runs of open conductors shall be located where the conductors are not subject to physical damage, and the conductors shall be fastened at intervals not exceeding 10 feet (3 m). Each branch circuit that supplies receptacles or fixed equipment shall contain a separate equipment grounding conductor where run as an open conductor.

[S] **3305.6.2.** Temporary lights shall be equipped with guards to prevent accidental contact with the bulb unless the construction of the reflector is such that the bulb is deeply recessed. Temporary lighting fixtures, such as quartz, that operate at temperatures capable of igniting ordinary combustibles shall be fastened securely so that the possibility of their coming in contact with such materials is precluded. Temporary lights shall be equipped with heavy-duty electrical cords with connections and insulation maintained in safe condition. Temporary lights shall not be suspended by their electrical cords unless such cords and lights have been designed for that purpose. Splices shall have insulation equivalent to that of the cable. Temporary wiring shall be removed immediately upon the completion of the construction or purpose for which the wiring was installed.

[W] ~~((3305.8))~~ **3305.7 Cooking.** Cooking shall be prohibited except in *approved* designated cooking areas separated from combustible materials by a minimum of 10 feet (3048 mm). Signs with a minimum letter height of 3 inches (76 mm) and a minimum brush stroke of 1/2 inch (13 mm) shall be posted in conspicuous locations in designated cooking areas and state:

DESIGNATED COOKING AREA  
COOKING OUTSIDE OF A DESIGNATED COOKING AREA IS PROHIBITED

[W][S] ~~((3309.1 General))~~ **3305.8 Portable generators.** Portable generators used at construction and demolition sites shall comply with Section 1204.

[W][S] ~~((3303.8))~~ **3305.9 Hot work operations.** The site safety director shall ensure hot work operations and permit procedures are in accordance with Chapter 35.

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[W] ~~((3318.1 General))~~ **3305.10 Safeguarding roof operations.** Roofing operations utilizing heat-producing systems or other ignition sources shall be conducted in accordance with Sections ~~((3318.2))~~ 3305.10.1 and ~~((3318.3))~~ 3305.10.2 and Chapter 35.

[W][S] ~~((3318.2))~~ **3305.10.1 Asphalt ~~((and))~~ tar kettles.** Asphalt ~~((and))~~ tar kettles shall be operated in accordance with ~~((Section 303))~~ Sections 3305.10.1.1 through 3305.10.1.9.

[S] **3305.10.1.1.** Asphalt (tar) kettles shall not be located within 20 feet (6096 mm) of any combustible material, combustible building surface or any building opening and within a controlled area identified by the use of traffic cones, barriers or other *approved* means.

[S] **3305.10.1.2.** Asphalt (tar) kettles and pots shall not be utilized inside or on the roof of a building or structure. Roofing kettles and operating asphalt (tar) kettles shall not block means of egress, gates, roadways or entrances. In no case shall kettles be closer than 10 feet (3048 mm) from exits or means of egress.

**Exception:** Rubberized asphalt melters are allowed to be utilized on the roofs of a building or structure.

[S] 3305.10.1.3. Fuel containers shall be located at least 10 feet (3048 mm) from the burner.

Exception: Containers properly insulated from heat or flame are allowed to be within 2 feet (610 mm) of the burner.

[S] 3305.10.1.4. An operating kettle shall be attended by a minimum of one employee knowledgeable of the operations and hazards. The employee shall be within 25 feet (7600 mm) of the kettle and have the kettle within sight. Ladders or similar obstacles shall not form a part of the route between the attendant and the kettle.

[S] 3305.10.1.5. Hi-boys shall be constructed of noncombustible materials. Hi-boys shall be limited to a capacity of 55 gallons (208 L). Fuel sources or heating elements shall not be allowed as part of a hi-boy.

[S] 3305.10.1.6. Asphalt (tar) kettles shall be equipped with tightfitting lids that can be closed by means of gravity constructed of steel having a thickness of not less than No. 14 manufacturer's standard gauge (0.075 inch (2 mm)).

[S] 3305.10.1.7. Roofing kettles shall be constructed of noncombustible materials.

[S] 3305.10.1.8. Used roofing mops and rags shall be cleaned of excessive asphalt and stored away from the building and combustible materials. Discarded roofing mops and rags shall not be in contact with combustibles.

[S] 3305.10.1.9. Fuel containers that operate under air pressure shall not exceed 20 gallons (76 L) in capacity and shall be approved.

[W] ((~~3318.3~~) 3305.10.2 Fire extinguishers for roofing operations. Fire extinguishers shall comply with Section 906. There shall be not less than one multiple-purpose portable fire extinguisher with a minimum 3-A 40-B:C rating on the roof being covered or repaired.

**[W] SECTION 3306  
((~~FLAMMABLE AND COMBUSTIBLE LIQUIDS~~))  
FIRE PROTECTION SYSTEMS AND DEVICES**

[W] ((~~3303.7~~) 3306.1 Fire protection devices. The site safety director shall ensure that all fire protection equipment is maintained and serviced in accordance with this code. Fire protection equipment shall be inspected in accordance with the fire protection program.

[W][S] ((~~3303.9~~) 3306.2 Impairment of fire protection systems. ((The site safety director shall ensure impairments to any fire protection system are in accordance with Section 904.)) Where a fire protection system is out of service, the procedures in Administrative Rule 9.04, Impaired Fire Protection Systems and Emergency Responder Radio Amplification Systems, shall be implemented.

[S] 3306.2.1. The fire prevention program superintendent shall be the impairment coordinator to comply with the requirements of this section. In the absence of the fire prevention program superintendent, the building owner shall be considered the impairment coordinator.

[S] ((~~3303.9.1~~) 3306.3 Smoke detectors and smoke alarms. Smoke detectors and smoke alarms located in an area where airborne construction dust is expected shall be covered to prevent exposure to dust or shall be temporarily removed. Smoke detectors and alarms that were removed shall be replaced upon conclusion of dust-producing work. Smoke detectors and smoke alarms that were covered shall be inspected and cleaned, as necessary, upon conclusion of dust-producing work.

[W] ((~~3303.10~~) 3306.4 Temporary covering of fire protection devices. Coverings placed on or over fire protection devices to protect them from damage during construction processes shall be immediately removed upon the completion of the construction processes in the room or area in which the devices are installed.

[W][S] ((~~3315.1 Completion before occupancy~~) 3306.5 Automatic sprinkler system. In buildings where an automatic sprinkler system is required by this code or the International Building Code, it shall be unlawful to occupy any portion of a building or structure until the automatic sprinkler system installation has been tested and approved, ((except as provided in Section 105.3.4)) unless approved by the building code official.

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[S] 3306.5.1. The provisions of Section 3306.5 shall not prohibit occupancy of the lower floors of a building, even where the upper floors are in various stages of construction or protection, provided the following conditions are satisfied:

1. The sprinkler protection of the lower occupied floors is completed and tested in accordance with Section 3306.5.
2. The lower floor sprinkler protection is supplied in such a manner that its water supply does not have to be shut off to facilitate the sprinkler system installation on the upper floors, except for a one-time closure to complete the riser installation.

[W][S] ((~~3315.2~~) 3306.5.2 Operation of valves. Operation of sprinkler control valves shall be allowed only by ((properly authorized)) personnel ((and shall be accompanied by notification of duly designated parties)) who have obtained the proper certificate from the fire code official in accordance with Administrative Rule 9.01, Certificates of Competency for Installing, Inspecting, Testing and Maintaining Fire Protection Systems. The Seattle Fire Department must be notified in accordance with Administrative Rule 9.04, Impaired Fire Protection Systems and Emergency Responder Radio Amplifica-

## FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

tion Systems, if a planned or emergency impairment is anticipated to take a system out of service for more than eight hours. Where the sprinkler protection is being regularly turned off and on to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

\*\* [W][S] (~~3316.1 Where required~~) **3306.6 Portable fire extinguishers.** Structures under construction, *alteration* or demolition shall be provided with not less than one *approved* portable fire extinguisher in accordance with Section 906 and sized for not less than ordinary hazard as follows:

1. At each *stairway* on all floor levels where combustible materials have accumulated.
2. In every storage and construction shed.
3. Additional portable fire extinguishers shall be provided where special hazards exist including, but not limited to, the storage and use of *flammable* and *combustible liquids*.
4. In every room or space within the building used for storage, a dressing room, or a workshop.
5. Temporary enclosures shall be equipped with a minimum of one fire extinguisher suitable for all classes of fires that are expected inside the enclosure located so that the travel distance to a fire extinguisher does not exceed 50 feet (15 240 mm).
6. A minimum of one portable fire extinguisher complying with Section 906 and with a minimum 2-A:20-B:C rating shall be readily accessible within 30 feet (9144 mm) of the location where hot work is performed.

### [W] SECTION 3307 (~~FLAMMABLE GASES~~) FIRE DEPARTMENT SITE ACCESS AND WATER SUPPLY

[W][S] (~~3311.1~~) **3307.1 Required access.** *Approved* (~~vehicle~~) fire apparatus access (~~for fire fighting~~) shall be provided to all construction or demolition sites at the start of the project and maintained until completion. Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (6096 mm), exclusive of shoulders, except for *approved* security gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than 14 feet (4267 mm). Fire apparatus access shall be provided to within 150 feet (45 720 mm) of all portions of the facility and all portions of the exterior walls of the first story of the building as measured by an *approved* route around the exterior of the building or facility. (~~Vehicle~~) Fire apparatus access shall be provided to within 100 feet (30 480 mm) of temporary or permanent fire department connections. (~~Vehicle~~) Fire apparatus access shall be provided by either temporary or permanent roads, capable of supporting vehicle loading under all weather conditions. Vehicle access shall be maintained until permanent fire apparatus access roads are available. "No parking" signs or other appropriate notices, or both, prohibiting obstruction shall be provided and shall be maintained.

[W][S] (~~3311.2~~) **3307.1.1 Key boxes.** (~~Key boxes shall be provided as required by Chapter 5.~~) Where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for life-saving or fire-fighting purposes, the fire code official is authorized to require a key box to be installed in an *approved* location. The key box shall be of an *approved* type and shall contain keys to gain necessary access as required by the fire code official.

\*\* [W][BE] (~~3312.1~~) **3307.1.2 Stairways required.** Where building construction exceeds 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access, a temporary or permanent *stairway* shall be provided. As construction progresses, such *stairway* shall be extended to within one floor of the highest point of construction having secured decking or flooring.

[S] **3307.1.2.1 Stairway floor number signs.** Temporary stairway floor number signs shall be provided in accordance with the requirements of Section 1023.9.1.

[W][S] (~~3312.2~~) **3307.1.3 Maintenance.** (~~Required means of egress and required accessible means of egress shall be maintained during construction and demolition, remodeling or alterations and additions to any building.~~) Buildings, or portions of buildings, shall be permitted to be occupied during construction, repair, alterations, or additions only where required means of egress are in place and continuously maintained for the portion occupied or where *approved* alternative life safety measures are in place.

**Exception:** (~~Approved~~) Existing means of egress need not be maintained where temporary means of egress and accessible means of egress systems and facilities *approved* by the building code official are provided.

[S] **3307.1.4 Hoists and elevators.** Where hoists and elevators provide the only efficient means of transporting hose and other cumbersome fire-fighting equipment to upper floors, they shall be available to the fire department whenever necessary.

\*\* [W] (~~3313.1 When required~~) **3307.2 Water supply for fire protection.** An *approved* water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible building materials arrive on the site, on

commencement of vertical combustible construction and on installation of a standpipe system in buildings under construction, in accordance with Sections ~~((3313.2 through 3313.5))~~ 3307.2.1 through 3307.4.

**Exception:** The *fire code official* is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

[W] ~~((3313.2))~~ 3307.2.1 Combustible building materials. When combustible building materials of the building under construction are delivered to a site, a minimum fire flow of 500 gallons per minute (1893 L/m) shall be provided. The fire hydrant used to provide this fire-flow supply shall be within 500 feet (152 m) of the combustible building materials, as measured along an *approved* fire apparatus access lane. Where the site configuration is such that one fire hydrant cannot be located within 500 feet (152 m) of all combustible building materials, additional fire hydrants shall be required to provide coverage in accordance with this section.

[W] ~~((3313.3))~~ 3307.2.2 Vertical construction of Types III, IV and V construction. Prior to commencement of vertical construction of Type III, IV or V buildings that utilize any combustible building materials, the fire flow required by Sections ~~((3313.3.1 through 3313.3.3))~~ 3307.2.2.1 through 3307.2.2.3 shall be provided, accompanied by fire hydrants in sufficient quantity to deliver the required fire flow and proper coverage.

~~((3313.3.1))~~ 3307.2.2.1 Fire separation up to 30 feet. Where a building of Type III, IV or V construction has a *fire separation distance* of less than 30 feet (9144 mm) from property lot lines, and an adjacent property has an existing structure or otherwise can be built on, the water supply shall provide either a minimum of 500 gallons per minute (1893 L/m) or the entire fire flow required for the building when constructed, whichever is greater.

~~((3313.3.2))~~ 3307.2.2.2 Fire separation of 30 feet up to 60 feet. Where a building of Type III, IV or V construction has a fire separation distance of 30 feet (9144 mm) up to 60 feet (18 288 mm) from property lot lines, and an adjacent property has an existing structure or otherwise can be built on, the water supply shall provide a minimum of 500 gallons per minute (1893 L/m) or 50 percent of the fire flow required for the building when constructed, whichever is greater.

~~((3313.3.3))~~ 3307.2.2.3 Fire separation of 60 feet or greater. Where a building of Type III, IV or V construction has a fire separation of 60 feet (18 288 mm) or greater from a property *lot line*, a water supply of 500 gallons per minute (1893 L/m) shall be provided.

[W][S] ~~((3313.4))~~ 3307.3 Vertical construction, Type I and II construction. If combustible building materials are delivered to the construction site, water supply in accordance with Section ~~((3313.2))~~ 3307.2 shall be provided. Additional water supply for fire flow is not required prior to commencing vertical construction of Type I and II buildings.

[W] ~~((3313.5))~~ 3307.4 Standpipe supply. Regardless of the presence of combustible building materials, the construction type or the *fire separation distance*, where a standpipe is required in accordance with Section ~~((3314))~~ 3307, a water supply providing a minimum flow of 500 gallons per minute (1893 L/m) shall be provided. The fire hydrant used for this water supply shall be located within 100 feet (30 480 mm) of the fire department connection supplying the standpipe.

[W][S] ~~((3314.1 Where required))~~ 3307.5 Standpipes. In buildings required to have standpipes by Section 905.3.1, not less than one standpipe shall be provided for use during construction. Such standpipes shall be installed prior to construction exceeding 40 feet (12 192 mm) in height above the lowest level of fire department ~~((vehicle))~~ apparatus access. ~~((Such standpipes shall be provided with fire department hose connections at locations adjacent to stairways complying with Section 3307.1.3. As construction progresses, such standpipes shall be extended to within one floor of the highest point of construction having secured decking or flooring.))~~ \*\*

[S] 3307.5.1. The standpipes shall be provided with conspicuously marked and readily accessible fire department connections on the outside of the building at the street level and shall have at least one standard hose outlet at each floor. The standpipes shall be securely supported and restrained at each alternate floor.

[S] 3307.5.2. At least one *approved* hose valve for attaching fire department hose shall be provided at each intermediate landing or floor level in the exit stairway, as determined by the authority having jurisdiction. Valves shall be kept closed at all times and guarded against mechanical injury.

[S] 3307.5.3. The standpipes shall be extended up with each floor and shall be securely capped at the top. Top hose outlets shall be not more than one floor below the highest forms, staging, and similar combustibles at all times.

~~[W][S] ((3307.5.1 Buildings being demolished. Where a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition so as to be available for use by the fire department. Such standpipe shall be demolished with the building but shall not be demolished more than one floor below the floor being demolished.))~~

[W][S] ~~((3314.3))~~ 3307.5.4 Detailed requirements. Standpipes shall be installed in accordance with the provisions of Section 905.

**Exception:** Standpipes shall be either temporary or permanent in nature, and with or without a water supply, provided that such standpipes comply with the requirements of Section 905 as to capacity, outlets and materials.

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[S] 3307.6. Where underground water mains and hydrants are to be provided, they shall be installed, completed, and in service prior to commencing construction work on any structure.

[S] 3307.7. Free access from the street to fire hydrants and to outside connections for standpipes, sprinklers, or other fire extinguishing equipment, whether permanent or temporary, shall be provided and maintained at all times.

[S] 3307.8. Protective pedestrian walkways shall not be constructed so that they impede access to hydrants.

[S] 3307.9. No material or construction shall interfere with access to hydrants, fire department connections, or fire extinguishing equipment.

### **[W] SECTION ((3317)) 3308 MOTORIZED CONSTRUCTION EQUIPMENT**

\*\* [W][S] ((3317.4)) 3308.1 **Conditions of use.** Internal-combustion-powered construction equipment, such as air compressors, hoists, derricks, pumps, and similar devices, shall be used in accordance with all of the following conditions:

1. Equipment shall be located so that exhausts do not discharge against combustible material.
2. Exhausts shall be piped to the outside of the building. A clearance of at least 9 inches (230 mm) shall be maintained between such piping and combustible material.  
(~~3. Equipment shall not be refueled while in operation.~~)
3. Internal-combustion-powered equipment shall be shut down and allowed to cool sufficiently prior to refueling.
4. Fuel for equipment shall be stored in an *approved* area outside of the building.

### **[W] SECTION ((3308)) 3309 ((EXPLOSIVE MATERIALS)) HAZARDOUS MATERIALS**

[W][S] ((3306.1 Storage of flammable)) 3309.1 **Flammable and combustible liquids.** (~~Storage of flammable and combustible liquids~~) Temporary storage and dispensing of Class I and II liquids for private use at construction sites shall be in accordance with Sections 5701, 5703, 5704 and 5705 except as provided in Sections 3309.1.1 through 3309.1.8.1.

Exception: Storage and use of fuel oil and containers connected with oil-burning equipment regulated by Section 605 and the International Mechanical Code.

[W][S] ((3309.1.1 Class I and Class II liquids. The storage, use and handling of *flammable* and *combustible liquids* at construction sites shall be in accordance with Section 5706.2. Ventilation shall be provided for operations involving the application of materials containing flammable solvents.))

[S] 3309.1.1 **Combustibles and open flames near tanks.** Storage areas shall be kept free from weeds and extraneous combustible material. Open flames and smoking are prohibited in flammable or combustible liquid storage areas. “No Smoking” signs shall be posted in a conspicuous location in each structure or location in which smoking is prohibited. The content, lettering, size, color and location of required “No Smoking” signs shall be *approved*. Storage areas shall be appropriately posted with markings in accordance with NFPA 704, Standard System for the Identification of the Hazards of Materials for Emergency Response.

[S] 3309.1.2 **Marking of tanks and containers.** Tanks and containers for the storage of liquids above ground shall be conspicuously marked with the name of the product which they contain and the words: FLAMMABLE—KEEP FIRE AND FLAME AWAY. Tanks shall bear the additional marking: KEEP 50 FEET FROM BUILDINGS.

[S] 3309.1.3 **Containers for storage and use.** Metal containers used for storage of Class I or II liquids shall be in accordance with DOTn requirements or shall be of an *approved* design. Discharge devices shall be of a type that do not develop an internal pressure on the container. Pumping devices or *approved* self-closing faucets used for dispensing liquids shall not leak and shall be well-maintained. Individual containers shall not be interconnected and shall be kept closed when not in use. Containers stored outside of buildings shall be in accordance with Section 5704 and the International Building Code.

[S] 3309.1.4 **Temporary tanks.** The capacity of above-ground tanks containing Class I or II liquids shall not exceed 10 000 gallons (37 854 L). Tanks shall be of the single-compartment design.

[S] 3309.1.4.1 **Fill-opening security.** Fill openings shall be equipped with a locking closure device. Fill openings shall be separate from vent openings.

[S] 3309.1.4.2 **Vents.** Tanks shall be provided with a method of normal and emergency venting. Normal vents shall also be in accordance with Section 5704.2.7.3. Emergency vents shall be in accordance with Section 5704.2.7.4. Emergency vents shall be arranged to discharge in a manner which prevents localized overheating or flame impingement on any part of the tank in the event that vapors from such vents are ignited.

[S] 3309.1.4.3 **Location.** Tanks containing Class I or II liquids shall be kept outside and at least 50 feet (15 240 mm) from buildings and combustible storage. Additional distance shall be provided when necessary to ensure that vehicles,

equipment and containers being filled directly from such tanks will not be less than 50 feet (15 240 mm) from structures, or other combustible storage.

**[S] 3309.1.4.4 Locations where above-ground tanks are prohibited.** The storage of Class I and II liquids in above-ground tanks is prohibited within the limits established by law as the limits of districts in which such storage is prohibited.

**[S] 3309.1.5 Type of tank.** Tanks shall be provided with top openings only or shall be elevated for gravity discharge.

**[S] 3309.1.5.1 Tanks with top openings only.** Tanks with top openings shall be mounted as follows:

1. On well-constructed metal legs connected to shoes or runners designed so that the tank is stabilized and the entire tank and its supports can be moved as a unit; or
2. For stationary tanks, on a stable base of timbers or blocks approximately 6 inches (152 mm) in height that prevents the tank from contacting the ground.

**[S] 3309.1.5.1.1 Pumps and fittings.** Tanks with top openings only shall be equipped with a tightly and permanently attached, approved pumping device having an approved hose of sufficient length for filling vehicles, equipment or containers to be served from the tank. Either the pump or the hose shall be equipped with a padlock to its hanger to prevent tampering. An effective anti-siphoning device shall be included in the pump discharge unless a self-closing nozzle is provided. Siphons or internal pressure discharge devices shall not be used.

**[S] 3309.1.5.2 Tanks for gravity discharge.** Tanks with a connection in the bottom or the end for gravity-dispensing liquids shall be mounted and equipped as follows:

1. Supports to elevate the tank for gravity discharge shall be designed to carry all required loads and provide stability.
2. Bottom or end openings for gravity discharge shall be equipped with a valve located adjacent to the tank shell which will close automatically in the event of fire through the operation of an effective heat-activated releasing device. Where this valve cannot be operated manually, it shall be supplemented by a second, manually operated valve. The gravity discharge outlet shall be provided with an approved hose equipped with a self-closing valve at the discharge end of a type that can be padlocked to its hanger.

**[S] 3309.1.6 Spill control drainage control and diking.** Indoor storage and dispensing areas shall be provided with spill control and drainage control as set forth in Section 5703.4 when the quantity exceeds 30 gallons of Class I flammable liquids or 120 gallons of Class II combustible liquids. Outdoor storage areas shall be provided with drainage control or diking as set forth in Section 5704.2.10 when the quantity exceeds 660 gallons aggregate of Class I and II flammable and combustible liquids.

**Exception:** Spill control and diking is not required for listed secondary containment tanks.

**[S] 3309.1.6.1 Leakage and spills.** Leaking vessels shall be immediately repaired or taken out of service and spills shall be cleaned up and disposed of properly.

**[S] 3309.1.7 Portable fire extinguishers.** Portable fire extinguishers with a minimum rating of 20-B:C and complying with Section 906 shall be provided where required by the fire code official.

**[S] 3309.1.8 Dispensing from tank vehicles.** Where approved, liquids used as fuels are allowed to be transferred from tank vehicles into the tanks of motor vehicles or special equipment, provided all of the following are true:

1. The tank vehicle's specific function is that of supplying fuel to motor vehicle fuel tanks;
2. The dispensing hose does not exceed 100 feet (30 480 mm) in length;
3. The dispensing nozzle is an approved type;
4. The dispensing hose is properly placed on an approved reel or in a compartment provided before the tank vehicle is moved;
5. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of refueling are prominently posted on the tank vehicle;
6. Electrical devices and wiring in areas where fuel dispensing is conducted are in accordance with NFPA 70;
7. Tank vehicle-dispensing equipment is operated only by designated personnel who are trained to handle and dispense motor fuels; and
8. Provisions are made for controlling and mitigating unauthorized discharges.

**[S] 3309.1.8.1 Location.** Dispensing from tank vehicles shall be conducted at least 50 feet (15 240 mm) from structures or combustible storage.

**[W] ((3306.3)) 3309.1.9 Housekeeping.** Flammable and combustible liquid storage areas shall be maintained clear of combustible vegetation and waste materials. Such storage areas shall not be used for the storage of combustible materials.



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[W] ~~((3306.4))~~ **3309.1.10 Precautions against fire.** Sources of ignition and smoking shall be prohibited in *flammable* and *combustible liquid* storage areas. Signs shall be posted in accordance with Section 310.

[W] ~~((3306.5))~~ **3309.1.11 Handling at point of final use.** Class I and II liquids shall be kept in *approved* safety containers.

[W] ~~((3306.6))~~ **3309.1.12 Leakage and spills.** Leaking vessels shall be immediately repaired or taken out of service and spills shall be cleaned up and disposed of properly.

[S] **3309.1.13 Floor surfacing and finishing operations.** Floor surfacing and finishing operations exceeding 350 square feet (33 m<sup>2</sup>) and using Class I or II liquids shall be in accordance with Section 2410.

[W] ~~((3307.1))~~ **3309.2 Storage and handling of flammable gas.** The storage, use and handling of flammable gases shall comply with Chapter 58.

[W] ~~((3307.2))~~ **3309.2.1 Cleaning with flammable gas.** Flammable gases shall not be used to clean or remove debris from piping open to the atmosphere.

[W] ~~((3307.2.1))~~ **3309.2.2 Pipe cleaning and purging.** The cleaning and purging of flammable gas piping systems, including cleaning new or existing piping systems, purging piping systems into service and purging piping systems out of service, shall comply with NFPA 56.

### Exceptions:

1. *Compressed gas* piping systems other than fuel gas piping systems where in accordance with Chapter 53.
2. Piping systems regulated by the *International Fuel Gas Code*.
3. Liquefied petroleum gas systems in accordance with Chapter 61.

[W][S] ~~((3308.1))~~ **3309.3 Storage and handling.** *Explosive* materials shall be stored, used and handled in accordance with Chapter 56 and NFPA 495.

[W][S] ~~((3308.2 Supervision))~~ **3309.3.1 Blasting.** Blasting operations shall be conducted only by approved, competent operators familiar with the required safety precautions and the hazards involved and in accordance with Chapter 56 and NFPA 495.

[S] **3309.3.1.1.** Before approval to do blasting is issued, the applicant shall obtain and provide documentation of liability insurance in accordance with Section 105.3.9.

[W][S] ~~((3309.3.2 Demolition using explosives. Approved fire hoses for use by demolition personnel shall be maintained at the demolition site wherever explosives are used for demolition. Such fire hoses shall be connected to an approved water supply and shall be capable of being brought to bear on post detonation fires anywhere on the site of the demolition operation.))~~

## [W] SECTION ~~((3309))~~ **3310** ~~((PORTABLE GENERATORS))~~ **ADDITIONAL SAFEGUARDS FOR OCCUPIED BUILDINGS**

[W] ~~((3312.3))~~ **3310.1 Storage.** Combustible materials associated with construction, demolition, remodeling or *alterations* to an occupied structure shall not be stored in *exits*, enclosures for *stairways* and *ramps*, or *exit access corridors* serving an occupant load of 30 or more.

### Exceptions:

1. Where the only occupants are construction workers.
2. Combustible materials that are temporarily accumulated to support work being performed when workers are present.

[S] **3310.2.** Flammable or explosive substances or equipment for repairs or alterations shall be permitted in a building while the building is occupied if the condition of use and safeguards provided do not create any additional danger or impediment to egress beyond the normally permissible conditions in the building.

## [W] SECTION ~~((3310))~~ **3311** ~~((FIRE REPORTING))~~ **ADDITIONAL SAFEGUARDS FOR TYPE I AND II CONSTRUCTION**

[W] ~~((3305.9))~~ **3311.1 Separations between construction areas.** Separations used in Type I and Type II construction to separate construction areas from occupied portions of the building shall be constructed of materials that comply with one of the following:

1. Noncombustible materials.

2. Materials that exhibit a flame spread index not exceeding 25 when tested in accordance with ASTM E84 or UL 723.
3. Materials exhibiting a peak heat release rate not exceeding 300 kW/m<sup>2</sup> when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m<sup>2</sup> in the horizontal orientation on specimens at the thickness intended for use.

**[W] SECTION ~~((3344))~~ 3312  
~~((ACCESS FOR FIRE FIGHTING))~~**

**ADDITIONAL SAFEGUARDS FOR TYPE IV-A, IV-B, AND IV-C CONSTRUCTION**

~~((3303.5))~~ **3312.1 Fire safety requirements for buildings of Types IV-A, IV-B and IV-C construction.** Buildings of Types IV-A, IV-B and IV-C construction designed to be greater than six stories above *grade plane* shall comply with the following requirements during construction unless otherwise *approved* by the *fire code official*:

1. Standpipes shall be provided in accordance with Section ~~((3313))~~ 3307.
2. A water supply for fire department operations, as *approved* by the *fire code official* and the *fire chief*.
3. Where building construction exceeds six stories above *grade plane* and noncombustible protection is required by Section 602.4 of the *International Building Code*, at least one layer of noncombustible protection shall be installed on all building elements on floor levels, including mezzanines, more than four levels below active mass timber construction before additional floor levels can be erected.

**Exceptions:**

1. Shafts and vertical exit enclosures shall not be considered part of the active mass timber construction.
2. Noncombustible protection on the top surface of mass timber floor assemblies shall not be required before erecting additional floor levels.
4. Where building construction exceeds six stories above *grade plane*, required exterior wall coverings shall be installed on floor levels, including mezzanines, more than four levels below active mass timber construction before additional floor levels can be erected.

**Exception:** Shafts and vertical exit enclosures shall not be considered part of the active mass timber construction.

**~~((SECTION 3342  
MEANS OF EGRESS))~~**

**~~((SECTION 3343  
WATER SUPPLY FOR FIRE PROTECTION))~~**

**[S] SECTION 3313  
DEMOLITION**

**3313.1 Construction documents.** Construction documents and a schedule for demolition shall be submitted where required by the building code official. Where such information is required, no work shall be done until such construction documents or schedule, or both, are *approved*.

**3313.2 Pedestrian protection.** The work of demolishing any building shall not be commenced until pedestrian protection is in place as required by Chapter 33 of the Seattle Building Code and the Street Use Ordinance, Seattle Municipal Code Title 15.

**3313.3 Means of egress.** A horizontal exit shall not be destroyed unless and until a substitute means of egress has been provided and *approved*.

**3313.4 Standpipes.** Where a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition in conformity with the progress of demolition activity in such a manner so as to be available for use by the fire department. Such standpipe shall be demolished with the building but shall not be demolished more than one floor below the floor being demolished.

**3313.5 Demolition using explosives.** If explosives are used in demolition work (implosion), hose lines, at least two of 1-1/2-in. diameter or 2-1/2-in. diameter shall be provided in the immediate vicinity of the demolition site during the actual detonation for use by demolition personnel. The required hose lines shall be connected to an *approved* water supply and shall be of sufficient length to be capable of extinguishing any small fire anywhere on the demolition site after detonation.

**3313.6 Underground tanks.** When demolition occurs, all underground tanks on the site shall either be removed or filled, as required by this code.

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- **3313.7 Utility connections.** Service utility connections shall be discontinued and capped in accordance with requirements of the governing utility or agency including, but not limited to, Seattle Public Utilities, Seattle Department of Transportation, Seattle Department of Construction and Inspections, Seattle Fire Department, Seattle City Light, Puget Sound Energy, and CenturyLink.
- **3313.8 Removal of hazardous and combustible materials.** All asbestos and other hazardous material shall be removed prior to demolition, in accordance with regulations of the Environmental Protection Agency, the Puget Sound Clean Air Agency and other pertinent agencies. Combustible waste shall be removed in accordance with the International Fire Code.

~~((SECTION 3314  
STANDPIPES))~~

~~((SECTION 3315  
AUTOMATIC SPRINKLER SYSTEM))~~

~~((SECTION 3316  
PORTABLE FIRE EXTINGUISHERS))~~

~~((SECTION 3318  
SAFEGUARDING ROOFING OPERATIONS))~~

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## TIRE REBUILDING AND TIRE STORAGE

**3404.6 Telephone number.** The telephone number of the fire department and location of the nearest telephone shall be posted conspicuously in attended locations.

### SECTION 3405 OUTDOOR STORAGE

**3405.1 Individual piles.** Tire storage shall be restricted to individual piles not exceeding 5,000 square feet (464.5 m<sup>2</sup>) of continuous area. Piles shall not exceed 50,000 cubic feet (1416 m<sup>3</sup>) in volume or 10 feet (3048 mm) in height.

**3405.2 Separation of piles.** Individual tire storage piles shall be separated from other piles by a clear space of not less than 40 feet (12 192 mm).

**3405.3 Distance between piles of other stored products.** Tire storage piles shall be separated by a clear space of not less than 40 feet (12 192 mm) from piles of other stored product.

**[S] 3405.4 Distance from lot lines and buildings.** Tire storage piles in excess of 500 tires shall be located not less than 50 feet (15 240 mm) from *lot lines* and buildings. Tire storage piles with 500 tires or less shall be located at least 10 feet (3048 mm) from property lines and buildings.

**Exception:** Tire storage piles with 500 tires or less are permitted to be within 3 feet (914 mm) of property lines and buildings for storage not exceeding 6 feet (1829 mm) in height.

**3405.5 Fire breaks.** Storage yards shall be maintained free from combustible ground vegetation for a distance of 40 feet (12 192 mm) from the stored material to grass and weeds; and for a distance of 100 feet (30 480 mm) from the stored product to brush and forested areas.

**3405.6 Volume more than 150,000 cubic feet.** Where the bulk volume of stored product is more than 150,000 cubic feet (4248 m<sup>3</sup>), storage arrangement shall be in accordance with the following:

1. Individual storage piles shall comply with size and separation requirements in Sections 3405.1 through 3405.5.
2. Adjacent storage piles shall be considered to be a group, and the aggregate volume of storage piles in a group shall not exceed 150,000 cubic feet (4248 m<sup>3</sup>).

Separation between groups shall be not less than 75 feet (22 860 mm) wide.

**3405.7 Location of storage.** Outdoor waste tire storage shall not be located under bridges, elevated trestles, elevated roadways or elevated railroads.

### SECTION 3406 FIRE DEPARTMENT ACCESS

**3406.1 Required access.** New tire storage yards shall be provided with fire apparatus access roads in accordance with Section 503 and Section 3406.2. Existing tire storage yards shall be provided with fire apparatus access roads where required in Chapter 11.

**3406.2 Location.** Fire apparatus access roads shall be located within all pile clearances identified in Section 3405.4 and within all fire breaks required in Section 3405.5. Access roadways shall be within 150 feet (45 720 mm) of any point in the storage yard where storage piles are located, not less than 20 feet (6096 mm) from any storage pile.

### SECTION 3407 FENCING

**3407.1 Where required.** Where the bulk volume of stored material is more than 20,000 cubic feet (566 m<sup>3</sup>), a firmly anchored fence or other *approved* method of security that controls unauthorized access to the storage yard shall surround the storage yard.

**3407.2 Construction.** The fence shall be constructed of *approved* materials and shall be not less than 6 feet (1829 mm) high and provided with gates not less than 20 feet (6096 mm) wide.

**3407.3 Locking.** Gates to the storage yard shall be locked when the storage yard is not staffed.

**3407.4 Unobstructed.** Gateways shall be kept clear of obstructions and be fully openable at all times.

## CHAPTER 35

# WELDING AND OTHER HOT WORK

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**User note:**

**About this chapter:** Chapter 35 covers requirements for safety in welding and other types of hot work by reducing the potential for fire ignitions that usually result in large losses. Several different types of hot work would fall under the requirements found in Chapter 35, including both gas and electric arc methods and any open-torch operations. Many of the activities of this chapter focus on the actions of the occupants.

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### SECTION 3501 GENERAL

[S] **3501.1 Scope.** Welding, cutting, open torches and other hot work operations and equipment shall comply with this chapter.

**Exception:** Hot work on board marine vessels at dock or under construction or repair shall be in accordance with Administrative Rules 26.01.14, *Cutting, Welding and Other Hot Work on Marine Vessels*, 26.02.09, *Designated Marine Hot Work Facilities and Shipyards*, and any future revisions of these rules adopted by the fire code official.

**3501.2 Permits.** Permits shall be required as set forth in Section 105.5.

**3501.3 Restricted areas.** Hot work shall only be conducted in areas designed or authorized for that purpose by the personnel responsible for a hot work program. Hot work shall not be conducted in the following areas unless approval has been obtained from the fire code official:

1. Areas where the sprinkler system is impaired.
2. Areas where there exists the potential of an explosive atmosphere, such as locations where flammable gases, liquids or vapors are present.
3. Areas with readily ignitable materials, such as storage of large quantities of bulk sulfur, baled paper, cotton, lint, dust or loose combustible materials.
4. On board ships at dock or ships under construction or repair.
5. At other locations as specified by the fire code official.

**3501.4 Cylinders and containers.** Compressed gas cylinders and fuel containers shall comply with this chapter and Chapter 53.

**3501.5 Design and installation of oxygen-fuel gas systems.** An oxygen-fuel gas system with two or more manifolded cylinders of oxygen shall be in accordance with NFPA 51.

### SECTION 3502 DEFINITIONS

[S] **3502.1 Definitions.** The following terms are defined in Chapter 2:

**HOT WORK.**

**HOT WORK AREA.**

**HOT WORK EQUIPMENT.**

**HOT WORK PERMITS.**

**HOT WORK PROGRAM.**

**RESPONSIBLE PERSON.**

**THERMIT WELDING.**

### SECTION 3503 GENERAL REQUIREMENTS

**3503.1 General.** Hot work conditions and operations shall comply with this chapter.

**3503.2 Temporary and fixed hot work areas.** Temporary and fixed hot work areas shall comply with this section.

## WELDING AND OTHER HOT WORK

**3503.3 Hot work program permit.** Hot work permits, issued by an *approved* responsible person under a hot work program, shall be available for review by the *fire code official* at the time the work is conducted and for 48 hours after work is complete.

**3503.4 Qualifications of operators.** A permit for hot work operations shall not be issued unless the individuals in charge of performing such operations are capable of performing such operations safely. Demonstration of a working knowledge of the provisions of this chapter shall constitute acceptable evidence of compliance with this requirement.

**3503.5 Records.** The individual responsible for the hot work area shall maintain “prework check” reports in accordance with Section 3504.3.1. Such reports shall be maintained on the premises for not less than 48 hours after work is complete.

**3503.6 Signage.** Visible hazard identification signs shall be provided where required by Chapter 50. Where the hot work area is open to persons other than the operator of the hot work equipment, conspicuous signs shall be posted to warn others before they enter the hot work area. Such signs shall display the following warning:

CAUTION  
HOT WORK IN PROGRESS  
STAY CLEAR

## SECTION 3504 FIRE SAFETY REQUIREMENTS

**3504.1 Protection of combustibles.** Protection of combustibles shall be in accordance with Sections 3504.1.1 through 3504.1.9.

**3504.1.1 Combustibles.** Hot work areas shall not contain combustibles or shall be provided with appropriate shielding to prevent sparks, slag or heat from igniting exposed combustibles.

**3504.1.2 Openings.** Openings or cracks in walls, floors, ducts or shafts within the hot work area shall be tightly covered to prevent the passage of sparks to adjacent combustible areas, or shielded by metal fire-resistant guards, or curtains shall be provided to prevent passage of sparks or slag.

**3504.1.3 Housekeeping.** Floors shall be kept clean within the hot work area.

**3504.1.4 Conveyor systems.** Conveyor systems that are capable of carrying sparks to distant combustibles shall be shielded or shut down.

**3504.1.5 Partitions.** Partitions segregating hot work areas from other areas of the building shall be noncombustible. In fixed hot work areas, the partitions shall be securely connected to the floor such that gaps do not exist between the floor and the partition. Partitions shall prevent the passage of sparks, slag, and heat from the hot work area.

**3504.1.6 Floors.** Fixed hot work areas shall have floors with noncombustible surfaces.

**[S] 3504.1.7 Precautions in hot work.** Hot work shall not be performed on containers or equipment that contain or have contained *flammable liquids*, gases or solids until the containers and equipment have been thoroughly cleaned, inerted or purged; except that “hot tapping” shall be allowed on tanks and pipe lines where such work is to be conducted by (*approved*) qualified personnel. Hot work on *flammable* and *combustible liquid* storage tanks shall be conducted in accordance with Sections 3504 and 3510.

**3504.1.8 Sprinkler protection.** Automatic sprinkler protection shall not be shut off while hot work is performed. Where hot work is performed close to automatic sprinklers, noncombustible barriers or damp cloth guards shall shield the individual sprinkler heads and shall be removed when the work is completed. If the work extends over several days, the shields shall be removed at the end of each workday. The *fire code official* shall approve hot work where sprinkler protection is impaired.

**3504.1.9 Fire detection systems.** *Approved* special precautions shall be taken to avoid accidental operation of automatic fire detection systems.

**3504.2 Fire watch.** Fire watches shall be established and conducted in accordance with Sections 3504.2.1 through 3504.2.6.

**3504.2.1 When required.** A fire watch shall be provided during hot work activities and shall continue for not less than 30 minutes after the conclusion of the work. The *fire code official*, or the responsible manager under a hot work program, is authorized to extend the fire watch based on the hazards or work being performed.

**Exception:** Where the hot work area has no fire hazards or combustible exposures.

**3504.2.2 Location.** The fire watch shall include the entire hot work area. Hot work conducted in areas with vertical or horizontal fire exposures that are not observable by a single individual shall have additional personnel assigned to fire watches to ensure that exposed areas are monitored.

2. Station outlets shall be marked to indicate their intended usage.
3. Signs shall be posted, indicating clearly the location and identity of section shutoff valves.

**3509.4 Manifolding of cylinders.** Oxygen manifolds shall not be located in an acetylene generator room. Oxygen manifolds shall be located not less than 20 feet (6096 mm) away from combustible material such as oil or grease, and gas cylinders containing flammable gases, unless the gas cylinders are separated by a *fire partition*.

**3509.5 Identification of manifolds.** Signs shall be posted for oxygen manifolds with service pressures not exceeding 200 psig (1379 kPa). Such signs shall include the words:

LOW-PRESSURE MANIFOLD  
DO NOT CONNECT HIGH-PRESSURE CYLINDERS  
MAXIMUM PRESSURE 250 PSIG

**3509.6 Clamps.** Hose connections shall be clamped or otherwise securely fastened.

**3509.7 Inspection.** Hoses shall be inspected frequently for leaks, burns, wear, loose connections or other defects rendering the hose unfit for service.

### SECTION 3510 HOT WORK ON FLAMMABLE AND COMBUSTIBLE LIQUID STORAGE TANKS

**3510.1 General.** Hot work performed on the interior or exterior of tanks that hold or have held *flammable* or *combustible liquids* shall be in accordance with Sections 3504 and 3510.2 and Chapters 4, 5, 6, 7 and 10 of NFPA 326.

**3510.2 Prevention.** The following steps shall be taken to minimize hazards where hot work must be performed on a *flammable* or *combustible liquid* storage container:

1. Use alternative methods to avoid hot work where possible.
2. Analyze the hazards prior to performing hot work, identify the potential hazards and the methods of hazard control.
3. Hot work shall conform to the requirements of the code or standard to which the container was originally fabricated.
4. Test the immediate and surrounding work area with a combustible gas detector and provide for a means of continuing monitoring while conducting the hot work.
5. Qualified employees and contractors performing hot work shall use an industry-approved hot work permit system to control the work.
6. Personnel shall be properly trained on hot work policies and procedures regarding equipment, safety, hazard controls and job-specific requirements.
7. On-site safety supervision shall be present where hot work is in progress to protect the personnel conducting the hot work and provide additional overview of site-specific hazards.

### [S] SECTION 3511 THERMIT WELDING

**3511.1 General.** *Thermit welding* shall be in accordance with Sections 3511.1.1 through 3511.1.3.

**3511.1.1 Mold.** *In thermit welding, the mold shall be dried thoroughly before the charge is ignited and provided with a cover. The molds shall not be removed until sufficient cooling has taken place in accordance with the manufacturer's published instructions.*

**3511.1.2 Storage.** *The storage of thermit welding materials shall be in accordance with the following:*

1. *Bulk storage of thermit welding materials shall be maintained in a detached shed at least 50 feet (15 240 mm) from the main buildings.*
2. *Storage sheds shall be maintained dry, posted as a "No Smoking" area, and kept locked.*
3. *Containers for the starting material shall be closed tightly immediately after each use.*

**3511.1.3 Smoking restrictions.** *Smoking shall not be permitted in areas where thermit welding material is being used or stored.*

## [S] CHAPTER 36

# MARINAS AND BOATYARDS

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### User note:

**About this chapter:** Chapter 36 addresses the fire protection and prevention requirements for marinas. It was developed in response to the complications encountered by a number of fire departments responsible for the protection of marinas as well as fire loss history in marinas that lacked fire protection. Compliance with this chapter intends to establish safe practices in marina areas, provide an identification method for mooring spaces in the marina, and provide fire fighters with safe operational areas and fire protection methods to extend hose lines in a safe manner.

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### SECTION 3601 SCOPE

[S] **3601.1 Scope.** Marina and boatyard facilities shall be in accordance with this chapter and Seattle Building Code Section 429. This chapter applies to the construction and operation of marinas serving small recreational and commercial craft, yachts, and other craft of not more than 300 gross tons, docking facilities associated with multiple-family residences, and all associated piers, docks, and floats. This chapter also applies to boatyard facilities and structures used for construction, repair, storage, hauling and launching, or fueling of vessels if fire on a pier would pose an immediate threat to these facilities, or if a fire at a referenced facility would pose an immediate threat to a docking facility.

#### Exceptions:

1. Designated marine hot work facilities and shipyards shall be in accordance with Seattle Building Code Section 429 and Administrative Rule 26.02.09, Designated Hot Work Facilities and Shipyards, and any future revisions of this rule adopted by the fire code official.
2. Marine Terminals shall be in accordance with Seattle Building Code Section 429 and Administrative Rule 27.01.09, Marine Terminals, and any future revisions of this rule adopted by the fire code official.
3. Other waterfront structures, piers, wharves and buildings shall be in accordance with Seattle Building Code Section 429.
4. Private, noncommercial docking facilities constructed or occupied for the use of the owners or residents of the associated single-family dwelling.
5. Floating homes in accordance with Seattle Residential Code.

Marinas and covered moorage constructed pursuant to a version of this code earlier than the 2015 Seattle Fire Code shall be in accordance with Chapter 94.

**3601.2 Plans and approvals.** Plans for marina fire protection facilities shall be approved prior to installation. The work shall be subject to final inspection and approval after installation.

**[W] 3601.3 Permits.** For permits to operate marine motor fuel-dispensing stations, application of flammable or combustible finishes, and hot works, see Section 105.5.

### SECTION 3602 DEFINITIONS

[W][S] **3602.1 Definitions.** The following terms are defined in Chapter 2:

**BERTH.**

**BOAT.**

**BOATYARD.**

**COVERED BOAT MOORAGE.**

**DESIGNATED HOT WORK FACILITY.**

**FLOAT.**

**GRAVITY-OPERATED DROP OUT VENTS.**

**MARINA.**

**MARINE TERMINAL.**

**PIER.**



**MARINAS**

**SLIP.**

~~((VESSEL.))~~

**WHARF.**

**SECTION 3603  
GENERAL PRECAUTIONS**

**3603.1 Combustible debris.** Combustible debris and rubbish shall not be deposited or accumulated on land beneath marina structures, piers or wharves.

**[S] 3603.2 Sources of ignition.** Open-flame devices used for lighting or decoration on the exterior of a ~~((vessel,))~~ float, pier or wharf shall be *approved*.

**3603.3 Flammable or combustible liquid spills.** Spills of *flammable* or *combustible liquids* at or on the water shall be reported immediately to the fire department or jurisdictional authorities.

**3603.4 Rubbish containers.** Containers with tight-fitting or self-closing lids shall be provided for temporary storage of combustible debris, rubbish and waste material. The rubbish containers shall be constructed entirely of materials that comply with any one of the following:

1. Noncombustible materials.
2. Materials that meet a peak rate of heat release not exceeding 300 kW/m<sup>2</sup> where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m<sup>2</sup> in the horizontal orientation.

**3603.5 Electrical equipment.** Electrical equipment shall be installed and used in accordance with its listing, Section 603 of this code and Chapter 5 of NFPA 303 as required for wet, damp and hazardous locations.

**3603.6 Berthing and storage.** Berthing and storage shall be in accordance with Chapter 7 of NFPA 303.

**[S] 3603.7 ~~((Slip identification))~~ Signage.** ~~((Slips and mooring spaces shall be individually identified by an approved numeric or alphabetic designator. Space designators shall be posted at the space. Signs indicating the space designators located on finger piers and floats shall be posted at the base of all piers, finger piers, floats and finger floats.))~~ Marinas and boatyards shall be provided with conspicuous signage indicating the address of the piers, wharves and floats and, for those structures that are designed to support vehicles, the weight limit the structure can support. Numbers and letters shall be easily legible and have high contrast with the color of the sign background. Numbers and letters shall not be less than 5 inches (127 mm) in height.

**[S] 3603.8 Emergency plan.** Owners of piers, wharves, floats and marinas shall prepare an emergency plan for the facility. The plan shall include procedures for fire department notification and fire evacuation, and shall include the location of portable fire extinguishers and hose cabinets, sprinkler and standpipe system control valves, fire department connections and electrical disconnects.

**[S] 3603.8.1.** The marina or boatyard operator shall post in a prominent location, or provide to boat operators using a marina or boatyard for mooring, repair, servicing, or storage, a list of safe operating procedures containing the following:

1. Procedures for disposal of trash;
2. Location of nonsmoking areas;
3. Location of fire extinguishers and hoses;
4. Procedures for turning in a fire alarm; and
5. Fueling procedures.

**SECTION 3604  
FIRE PROTECTION EQUIPMENT**

**[S] 3604.1 General.** ~~((Piers, marinas and wharves with facilities for mooring or servicing five or more vessels,))~~ Marinas and boatyards and marine motor fuel-dispensing facilities shall be equipped with fire protection ~~((equipment))~~ features in accordance with Sections 3604.2 through ~~((3604.6))~~ 3604.11.

**[S] 3604.2 Standpipes.** ~~Marinas and boatyards shall be equipped throughout with ~~((standpipe systems in accordance with NFPA 303))~~ a manual Class I standpipe system in accordance with NFPA 14, or Class III standpipe system in accordance with NFPA 14, if *approved* by the *fire code official*, shall be provided for piers, wharves and floats if the hose lay distance from the fire apparatus to the most remote accessible portion of the pier, wharf or float exceeds 150 feet (45 720 mm). ~~((Systems shall be provided with hose connections located such that no point on the marina pier or float system exceeds 150 feet (15 240 mm) from a standpipe hose connection.))~~~~

Approved plastic pipe may be used if installed underwater, or if another approved method of protection from fire is provided.

The standpipe piping shall be a minimum of 4 inches (102 mm), sized to provide a minimum of 500 gpm (365 L/s) at 130 psi (896 kPa) at the most remote hose connection, with a simultaneous flow of 500 gpm (365 L/s) at the third most remote hose connection on the same pier while maintaining a maximum system pressure of 175 psi (1206 kPa).

**[S] 3604.2.1 Hose connections.** Hose connection stations on required standpipes shall be provided at the water end of the pier, wharf or float, and along the entire length of the pier, wharf or float at spacing not to exceed 150 feet (45 720 mm) and as close as practical to the land end. Each hose connection shall consist of a valved 2-1/2 inch (64 mm) fire department hose outlet. Outlet caps shall have a predrilled 1/8-inch (3.2 mm) hole for pressure relief and be secured with a short length of chain or cable to prevent falling after removal. Listed equipment shall be used.

**Exception:** The hose connection at the land end of the pier, wharf or float may be omitted when a hose connection is located within 150 feet (45 720 mm) of the fire apparatus access road.

**(~~3604.2.1~~) 3604.2.2 Identification of standpipe outlets.** Standpipe hose connection locations shall be clearly identified by a flag or other approved means designed to be readily visible from the pier accessing the float system.

**[S] 3604.3 Access and water supply.** ~~((Piers and wharves))~~ Marinas and boatyards shall be provided with fire apparatus access roads ((and water supply systems with on-site fire hydrants where required by the fire code official)) so located as to provide fire department apparatus access to within 50 feet (15 240 mm) travel distance to the shore end of all piers, wharves and floats. ((Such roads and water systems shall be provided and maintained in accordance with Sections 503 and 507.)) The fire apparatus access roads shall be in accordance with Section 503, Appendix D and Streets Illustrated, the Seattle Right of Way Improvement Manual.

Marinas and boatyards shall be provided with at least two fire hydrants. One fire hydrant shall be located within 500 feet (152 400 mm) of the closest point of fire department apparatus access to the shore end of the marina piers, wharves or floats, or to the fire department connection for those piers, wharves, or floats that are equipped with standpipes. The second fire hydrant shall be located within 1,000 feet (304 800 mm) of the closest point of fire department apparatus access to the shore end of the marina piers, wharves or floats, or to the fire department connection for those piers, wharves or floats that are equipped with standpipes. All required fire hydrants shall be capable of delivering not less than 1,000 gpm (63 L/s) at a minimum residual pressure of 20 psi (138 kPa) each. Such roads and water systems shall be maintained in accordance with Sections 503 and 507.

**[S] 3604.4 Portable fire extinguishers.** One portable fire extinguisher ((of the ordinary (moderate) hazard type)) having a minimum rating of 2A 20BC shall be provided at each required standpipe hose connection. Additional portable fire extinguishers, suitable for the hazards involved, shall be provided and maintained in accordance with Section 906 and NFPA 10.

**[S] 3604.5 Communications.** A telephone not requiring a coin to operate or other approved, clearly identified means to notify the fire department shall be provided within 75 feet (22 860 mm) of all portions of piers, wharves and floats. If required by the fire code official, additional fire extinguishers, suitable for the hazards involved, shall be provided on the site in a location approved by the fire code official. The street address of the marina and emergency telephone number(s) shall be displayed prominently on a sign at the telephone.

**3604.6 Emergency operations staging areas.** Space shall be provided on all float systems for the staging of emergency equipment. Emergency operation staging areas shall provide a minimum of 4 feet wide by 10 feet long (1219 mm by 3048 mm) clear area exclusive of walkways and shall be located at each standpipe hose connection. Emergency operation staging areas shall be provided with a curb or barrier having a minimum height of 4 inches (102 mm) and maximum space between the bottom edge and the surface of the staging area of 2 inches (51 mm) on the outboard sides of the staging area.

An approved sign reading "FIRE EQUIPMENT STAGING AREA—KEEP CLEAR" shall be provided at each staging area.

**[W] 3604.7 Smoke and heat vents.** Approved automatic smoke and heat vents shall be provided in covered boat moorage areas exceeding 2,500 square feet (232 m<sup>2</sup>) in area, excluding roof overhangs.

**Exception:** Smoke and heat vents are not required in areas protected by automatic sprinklers.

**3604.7.1 Design and installation.** Where smoke and heat vents are required they shall be installed near the roof peak, evenly distributed and arranged so that at least one vent is over each covered berth. The effective vent area shall be calculated using a ratio of one square foot (0.09 m<sup>2</sup>) of vent to every 15 square feet (1.4 m<sup>2</sup>) of covered berth area (1:15). Each vent shall provide a minimum opening size of 4 feet by 4 feet (1219 mm by 1219 mm).

**3604.7.1.1 Smoke and heat vents.** Smoke and heat vents shall operate automatically by actuation of a heat-responsive device rated at 100°F (56°C) above ambient.

**Exception:** Gravity-operated drop out vents.

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**3604.7.1.2 Gravity-operated drop out vents.** Gravity-operated drop out vents shall fully open within 5 minutes after the vent cavity is exposed to a simulated fire represented by a time-temperature gradient that reaches an air temperature of 500°F (260°C) within 5 minutes.

**[W] 3604.8 Draft curtains.** Draft curtains shall be provided in covered boat moorage areas exceeding 2,500 square feet (232 m<sup>2</sup>) in area, excluding roof overhangs.

**Exception:** Draft curtains are not required in areas protected by automatic sprinklers.

**3604.8.1 Draft curtain construction.** Draft curtains shall be constructed of sheet metal, gypsum board or other *approved* materials that provide equivalent performance to resist the passage of smoke. Joints and connections shall be smoke tight.

**3604.8.2 Draft curtain location and depth.** The maximum area protected by draft curtains shall not exceed 2,000 square feet (186 m<sup>2</sup>) or two slips or berths, whichever is smaller. Draft curtains shall not extend past the piling line. Draft curtains shall have a minimum depth of 4 feet (1219 mm) and shall not extend closer than 8 feet (2438 mm) to the walking surface of the pier.

**[S] 3604.9 Automatic sprinkler system.** *Approved* automatic sprinkler systems shall be installed in accordance with Sections 3604.9.1 through 3604.9.3 and Section 903.

**3604.9.1 Covered boat moorage.** Automatic sprinklers shall be provided for covered boat moorage exceeding 500 square feet (47 m<sup>2</sup>) in projected roof area over any *pier, wharf* or *float*. The sprinkler system shall be designed and installed in accordance with NFPA 13 for Extra Hazard Group 2 occupancy. If sprinklers are required by this chapter for covered boat moorage, the sprinklers shall be extended to any structure on the *pier, wharf* or *float* exceeding 500 square feet (47 m<sup>2</sup>) in projected roof area. For the purposes of this chapter, the projected roof area means the footprint of the roof.

**3604.9.2 Substructure.** Automatic sprinklers shall be installed under the substructure of every new marina and boatyard facility in accordance with NFPA 307 and as specified in Chapter 9.

### **Exceptions:**

- 1. Combustible substructures whose deck area does not exceed 8,000 square feet (743 m<sup>2</sup>) supporting no superstructures.**
- 2. Combustible substructures whose deck area does not exceed 8,000 square feet (743 m<sup>2</sup>) supporting superstructures not required to be provided with an *approved* automatic sprinkler system as specified in Section 429.9 of the Seattle Building Code.**
- 3. Noncombustible substructures with or without superstructures.**
- 4. Substructures, over other than tidal water, where sprinkler heads cannot be installed with a minimum clearance of 4 feet (1219 mm) above mean high water.**
- 5. Substructures resulting from walkways or finger piers that do not exceed 10 feet (3048 mm) in width.**

**3604.9.3 Superstructure.** Automatic sprinklers shall be provided in superstructures as specified in Chapter 9.

**[S] 3604.10 Fire department connections.** Standpipe and sprinkler systems shall be equipped with not less than a two-way 2-1/2-inch (64 mm) fire department connection, which shall be readily visible and located at the fire department apparatus access.

**[S] 3604.11 Draft stops.** Draft stops shall be provided under substructures in accordance with Section 429 of the Seattle Building Code.

## SECTION 3605 MARINE MOTOR FUEL-DISPENSING FACILITIES

**3605.1 Fuel dispensing.** Marine motor fuel-dispensing facilities shall be in accordance with Chapter 23.

**Exception:** Where an individual *laboratory suite* occupies more than one story, the *fire-resistance rating* of intermediate floors contained within the *laboratory suite* shall comply with the requirements of the *International Building Code*.

2. Separations as required in Section 508 of the *International Building Code*.

**3804.1.1.2 Separation from other laboratory suites.** *Laboratory suites* shall be separated from other *laboratory suites* in accordance with Table 3804.1.1.

**3804.1.1.3 Floor assembly fire resistance.** The floor assembly supporting *laboratory suites* and the construction supporting the floor of *laboratory suites* shall have a *fire-resistance rating* of not less than 2 hours.

**Exception:** The floor assembly of *laboratory suites* and the construction supporting the floor of *laboratory suites* are permitted to be 1-hour fire-resistance-rated in buildings of Types IIA, IIIA and VA construction, provided that the building is three or fewer stories.

**3804.1.1.4 Maximum number.** The maximum number of *laboratory suites* shall be in accordance with Table 3804.1.1. Where a building contains both *laboratory suites* and *control areas*, the total number of *laboratory suites* and *control areas* within a building shall not exceed the maximum number of *laboratory suites* in accordance with Table 3804.1.1.

**3804.1.1.5 Means of egress.** *Means of egress* shall be in accordance with Chapter 10.

**3804.1.1.6 Standby or emergency power.** Higher education *laboratory suites* shall be provided with emergency or standby power in accordance with Section 1203.2.14.

**3804.1.1.7 Ventilation.** Ventilation shall be in accordance with the *International Mechanical Code* and Chapter 7 of NFPA 45.

**3804.1.1.8 Liquid-tight floor.** Portions of *laboratory suites* where hazardous materials are present shall be provided with a liquid-tight floor.

**3804.1.1.9 Automatic fire-extinguishing systems.** Buildings containing *laboratory suites* shall be equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1.

**3804.1.2 Percentage of maximum allowable quantity in each laboratory suite.** The percentage of maximum allowable quantities of hazardous materials in each *laboratory suite* shall be in accordance with Table 3804.1.1.

## SECTION 3805 NONSPRINKLERED LABORATORIES

[S] **3805.1 Scope.** Storage and use of hazardous materials in existing laboratories located within existing buildings not equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 is permitted where such use complies with Section 3803, Chapters 50 through 67, as applicable, and Sections 3805.2 through 3805.4.

### **Exceptions:**

1. Existing laboratories that have a current Seattle Fire Department permit.
2. Substantial alterations in existing buildings shall comply with Sections 3801 through 3804.

**3805.2 Nonsprinklered laboratories.** The maximum allowable quantities of hazardous materials in storage and use in *control areas* in laboratories located in buildings not equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 shall be in accordance with Table 5003.1.1(1), Table 5003.1.1(2) and Table 5003.8.3.2, except as modified by Sections 3805.2.1 and 3805.2.2.

**3805.2.1 Restricted materials storage.** Where *approved* by the *fire code official*, storage of the following hazardous materials prohibited by Table 5003.1.1(1) in buildings not equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 shall be allowed within a *laboratory control area* at 25 percent of Table 5003.1.1(1) limits for a building equipped throughout with an *automatic sprinkler system*.

1. Class 4 oxidizers.
2. Pyrophorics.

The percentage of the *maximum allowable quantity per control area* shown in Table 3805.4 shall be applied to 25 percent of Table 5003.1.1(1) limits for Class 4 oxidizers or pyrophoric materials.

Additional quantity increases shall be prohibited, and such materials shall be stored in accordance with all of the following:

1. Containers shall be completely sealed and stored in accordance with the manufacturers' recommendations.
2. Storage shall be within *approved* hazardous material storage cabinets in accordance with Section 5003.8.7, or shall be located in an inert atmosphere glove box in accordance with NFPA 45, Section 7.11.

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3. The storage cabinet or *glove box* shall not contain any storage of *incompatible materials*.

**3805.2.2 Restricted materials use.** Where *approved* by the *fire code official*, use of the following hazardous materials prohibited by Table 5003.1.1(1) in buildings not equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, shall be allowed within a laboratory *control area* at 25 percent of Table 5003.1.1(1) limits for buildings equipped throughout with an *automatic sprinkler system*.

1. Class 4 oxidizers.
2. Pyrophorics.

The percentage of the *maximum allowable quantity per control area* shown in Table 3805.4 shall be applied to 25 percent of Table 5003.1.1(1) limits for Class 4 oxidizers or pyrophoric materials.

Additional quantity increases shall be prohibited, and such materials shall be stored in accordance with all of the following:

1. Use shall be within an *approved* chemical fume hood *listed* in accordance with UL 1805, or in an inert atmosphere glove box in accordance with NFPA 45, Section 7.11, or other *approved* equipment designed for the specific hazard of the material.
2. Combustible materials shall be kept not less than 2 feet (610 mm) away from the work area, except for those items directly related to the research.
3. A portable fire extinguisher appropriate for the specific material shall be provided within 20 feet (6096 mm) of the use in accordance with Section 906.

**3805.3 Restricted materials automatic fire detection.** An automatic fire detection system shall be installed in all existing laboratories in nonsprinklered buildings in accordance with this section. Detectors shall be connected to the building’s fire alarm control unit where a fire alarm system is provided. Detector initiation shall activate the occupant notification system in accordance with Section 907.5 where connected to the building’s fire alarm control unit. Activation of the detection system shall sound a local alarm in buildings not equipped with a fire alarm notification system.

**3805.3.1 System supervision and monitoring.** Automatic fire detection systems shall be electronically supervised and monitored by an *approved* supervising station or, where *approved*, shall initiate an audible and visual signal at a constantly attended, on-site location.

**3805.4 Percentage of maximum allowable quantity per control area.** The percentage of *maximum allowable quantities per control area* of hazardous materials shall comply with Table 3805.4.

**TABLE 3805.4  
DESIGN AND NUMBER OF CONTROL AREAS IN EXISTING NONSPRINKLERED LABORATORIES**

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA <sup>a, e</sup>	NUMBER OF CONTROL AREAS PER FLOOR	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS <sup>b, c, d</sup>
Above grade plane	Higher than 9	5	1	2 <sup>c</sup>
	7–9	10	2	2 <sup>c</sup>
	4–6	25	2	2 <sup>c</sup>
	3	75	2	1
	1–2	100	4	1
Below grade plane	1	100	3	1
	2	75	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

- a. Percentages shall be of the maximum allowable quantity per control area shown in Table 5003.1.1(1) and Table 5003.1.1(2), excluding all increases allowed in the footnotes to those tables.
- b. Fire barriers shall include walls, floors and ceilings necessary to provide separation from other portions of the building.
- c. Vertical fire barriers separating control areas from other spaces on the same floor are permitted to be 1-hour fire-resistance rated.
- d. See Section 414.2.4 of the *International Building Code* for additional requirements.
- e. The percentage of the maximum allowable quantity per control area shown in Table 3805.4 shall be applied to 25 percent of Table 5003.1.1(1) limits for Class 4 oxidizers or pyrophoric materials.

**SECTION 3806  
EXISTING SPRINKLERED LABORATORIES**

**[S] 3806.1 Scope.** Storage and use of hazardous materials in existing laboratories within buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 shall be in accordance with Section 3803 and with Chapters 50 through 67, as applicable, except as modified by this section.

**Exceptions:**

1. Existing laboratories that have a current Seattle Fire Department permit.
2. Substantial alterations in existing buildings shall comply with Sections 3801 through 3804.

**3806.2 Hazardous materials storage and use.** Storage and use of hazardous materials within *control areas* in new and existing laboratories equipped with an *automatic sprinkler system* shall be in accordance with this section and Chapters 50 through 67, as applicable.

**Exception:** Existing laboratories in buildings equipped throughout with an automatic sprinkler system meeting the requirements for *laboratory suites* are permitted to comply with Section 3804.

**3806.2.1 Percentage of maximum allowable quantities per control area.** The percentage of *maximum allowable quantities per control area* of hazardous materials shall be in accordance with Table 3806.2.1.

**TABLE 3806.2.1  
DESIGN AND NUMBER OF CONTROL AREAS IN EXISTING SPRINKLERED LABORATORIES**

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA <sup>a</sup>	NUMBER OF CONTROL AREAS PER FLOOR	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS <sup>b, d</sup>
Above grade plane	21+	5	1	2 <sup>c</sup>
	11–20	10	1	2 <sup>c</sup>
	7–10	25	2	2 <sup>c</sup>
	4–6	50	2	2 <sup>c</sup>
	3	75	3	1
	1–2	100	4	1
Below grade plane	1	100	3	1
	2	75	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

- a. Percentages shall be of the maximum allowable quantity per control area shown in Table 5003.1.1(1) and Table 5003.1.1(2), with all increases allowed in the footnotes to those tables.
- b. Fire barriers shall include walls, floors and ceilings necessary to provide separation from other portions of the building.
- c. Vertical fire barriers separating control areas from other spaces on the same floor are permitted to be 1-hour fire-resistance rated.
- d. See Section 414.2.4 of the *International Building Code* for additional requirements.

record shall include the serial number of the equipment used in the process and shall confirm that the equipment installed is the same model and type of equipment identified in the technical report.

### SECTION 3905 SAFETY SYSTEMS

[S] **3905.1 Gas detection.** For extraction processes utilizing flammable gases as solvents, a gas detection system complying with Section 916 shall be provided.

**3905.1.1 Operation.** Activation of the gas detection system shall result in all the following:

1. Initiation of distinct audible and visual alarm signals in the extraction room.
2. Deactivation of all heating systems located in the extraction room.
3. Activation of the mechanical ventilation system, where the system is interlocked with gas detection.
4. De-energize all light switches and electrical outlets.

**Exception:** Required means of egress illumination shall be maintained.

**3905.1.2 Failure of the gas detection system.** Failure of the gas detection system shall result in the deactivation of the heating system; activation of the mechanical ventilation system where the system is interlocked with the gas detection system; and initiation of a trouble signal to sound in an *approved* location.

**3905.2 Emergency shutoff.** Extraction processes utilizing gaseous hydrocarbon-based solvents shall be provided with emergency shutoff systems in accordance with Section 5803.1.3.

## [S] CHAPTER 48

# ROAD TUNNELS, BRIDGES AND OTHER LIMITED ACCESS HIGHWAYS

**4801 Scope.** Road tunnels, bridges and other limited access highways shall be in accordance with NFPA 502 (2020) and as amended as follows:

### Chapter 3 Definitions

**4803.1 NFPA 502 Section 3.2.2.** Modify NFPA Section 502 3.2.2 to read as follows:

**3.2.2\* Authority Having Jurisdiction (AHJ).** ~~((An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.))~~ The fire chief or other designated authority charged with the administration of the fire code, or a duly authorized representative.

\*\*\*

### Chapter 4 General Requirements

\*\*\*

**4804.1 NFPA 502 Section 4.2.** Modify NFPA 502 Section 4.2 to read as follows:

**4.2 Safeguards During Construction.** During the course of construction or alteration of any facility addressed in this standard, the provisions of ~~((NFPA 241)) Chapter 33 of the 2021 *Seattle Fire Code* and Chapter 33 of the 2021 *Seattle Building Code*~~ shall apply, except as modified herein.

\*\*\*

**4804.2 NFPA 502 Section 4.3.3.** Modify NFPA 502 Section 4.3.3 to read as follows:

**4.3.3\* Limited Access Highways.** Fire protection for limited access highways shall comply with the requirements of Chapter 5 and Chapter 10.

**4804.3 NFPA 502 Section 4.3.4.** Modify NFPA 502 Section 4.3.4 to read as follows:

**4.3.4 Bridges and Elevated Highways.** Fire protection for bridges and elevated highways shall comply with the requirements of Chapter 6 and Chapter 10.

**4804.4 NFPA 502 Section 4.3.5.** Modify NFPA 502 Section 4.3.5 to read as follows:

**4.3.5\* Depressed Highways.** ~~((Standpipe systems or fire extinguishers, or both, shall be installed on depressed highways where physical factors prevent or impede access to the water supply.))~~ Fire protection for depressed highways shall comply with the requirements of Chapter 5 and Chapter 10.

**4804.5 NFPA 502 Section 4.3.6.** Modify NFPA 502 Section 4.3.6 to read as follows:

**4.3.6\* Road Tunnels.** Fire protection for road tunnels shall comply with the requirements of Chapter 7 and Chapter 10.

**4804.6 NFPA 502 Section 4.3.7.** Modify NFPA 502 Section 4.3.7 to read as follows:

**4.3.7\* Roadway Beneath Air-Right Structures.** Fire protection for roadways that are located beneath air-right structures shall comply with the requirements of Chapter 8 and Chapter 10.

\*\*\*

**4804.7 NFPA 502 Section 4.5.** Modify NFPA 502 Section 4.5 to read as follows:

#### 4.5 Emergency Communications.

Emergency communications, ~~((where))~~ if required by the authority having jurisdiction, shall be provided by the installation of outdoor-type emergency telephone boxes, ~~((coded alarm telegraph stations,))~~ radio transmitters, or other *approved* devices that meet the following requirements:

- (1) They shall be made conspicuous by means of indicating lights or other *approved* markers.
- (2) They shall be identified by a readily visible number plate or other *approved* device.



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- (3) They shall be posted with instructions for use by motorists.
- (4) Where practicable, ((They)) they shall be located in *approved* locations so that motorists can park vehicles clear of the travel lanes.
- (5) Emergency communication devices shall be protected from physical damage from vehicle impact.
- (6) Emergency communication devices shall be connected to an *approved* constantly attended location.

\* \* \*

## Chapter 5 Limited Access and Depressed Highways

### ■ 4805.1 NFPA 502 Section 5.1. Modify NFPA 502 Section 5.1 to read as follows:

**5.1 General.** This chapter (~~shall~~) provides fire protection requirements for limited access and depressed highways.

\* \* \*

## Chapter 6 Bridges and Elevated Highways

\* \* \*

### ■ 4806.1 NFPA 502 Section 6.6. Modify NFPA 502 Section 6.6 to read as follows:

**6.6 ((Standpipe,)) Fire Hydrants (( $\tau$ )) and Water Supply**

### ■ 4806.2 NFPA 502 Section 6.6.1. Modify NFPA 502 Section 6.6.1 to read as follows:

**6.6.1\* Applicability.** Where the ((length of a bridge or elevated highway exceeds 300 m (1000 ft), a horizontal standpipe system shall be installed on the structure)) distance from any point on the bridge or elevated highway exceeds 120 m (400 ft) to a fire hydrant, the bridge or elevated highway shall be provided with a hydrant system in accordance with the requirements of Chapter 10.

\* \* \*

### ■ 4806.3 NFPA 502 Section 6.10. Modify NFPA 502 Section 6.10 to read as follows:

**6.10 Control of Hazardous Materials.** Where required by the authority having jurisdiction, control of hazardous materials shall be in accordance with the requirements of Chapter 14.

\* \* \*

## Chapter 7 Road Tunnels

\* \* \*

### ■ 4807.1 NFPA 502 Section 7.4.1. Modify NFPA 502 Section 7.4.1 to read as follows:

**7.4.1** Tunnels described in categories B, C, and D shall have at least two independent means of identifying and locating a fire. One of the independent means shall be automatic.

### ■ 4807.2 NFPA 502 Section 7.4.2. Modify NFPA 502 Section 7.4.2 to read as follows:

**7.4.2** ((Tunnels described in categories B, C, and D shall have an automatic fire detection system in accordance with 7.4.6-)) All fire alarm, detection, supervisory, and trouble signals shall be distinctly different and shall be automatically transmitted to a central station service that is listed in the current edition of the Underwriters Laboratories FIRE PROTECTION EQUIPMENT DIRECTORY under the category Central Station (UUFX) as a Full Service Company or as a Fire Alarm Service – Local Company which subcontracts the monitoring, retransmission and associated record keeping and reporting to a listed Full Service Company or Monitoring Company. The listing shall indicate that the Full Service Company or Fire Alarm Service – Local Company provides service to the Seattle area.

**Exception:** The operations control center may serve as a proprietary supervising station in accordance with NFPA 72 where *approved* by the authority having jurisdiction.

### ■ 4807.3 NFPA 502 Section 7.4.3. Modify NFPA 502 Section 7.4.3 to read as follows:

**7.4.3\*** Closed-circuit television (CCTV) systems ((with traffic flow indication devices or surveillance cameras shall be permitted for use to identify and locate fires in tunnels with 24-hour supervision)) shall be provided, and shall be capable of

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identifying the location of the fire within 15 m (50 ft). CCTVs with or without traffic-flow indication devices may automatically identify fires in tunnels if all of the components of the video image fire detection system, including hardware and software, are listed for the purpose of fire detection.

\*\*\*

**4807.4 NFPA 502 Section 7.18.** Add new NFPA 502 Section 7.18 to read as follows:

**7.18 Emergency Telephones.** Emergency telephones shall be installed at intervals of not more than 90 m (300 ft) and at all cross-passages, standpipe hose connection locations, and means of egress from the tunnel.

\*\*\*

**4807.5 NFPA 502 Section 7.4.6.1.** Modify NFPA 502 Section 7.4.6.1 to read as follows:

**7.4.6.1\*** Automatic fire detection systems and fixed water-based fire-fighting system water flow alarm-initiating devices shall be installed in accordance with Chapter 17 of *NFPA 72*, or ~~((other equivalent international standards,))~~ and approved by the AHJ (see also Annex M).

\*\*\*

**4807.6 NFPA 502 Section 7.4.6.5.** Modify NFPA 502 Section 7.4.6.5 to read as follows:

**7.4.6.5** Spot detectors shall have a light that remains on until the device is reset, or shall be provided with remote alarm or supervisory indication in a location acceptable to the authority having jurisdiction.

\*\*\*

**4807.7 NFPA 502 Sections 7.4.7.2.** Add new NFPA 502 Sections 7.4.7.2 through 7.4.7.2.2 to read as follows:

**7.4.7.2** Automatic fire detectors and fixed water-based fire-fighting system water flow alarm-initiating devices protecting the roadway and ancillary spaces within tunnels (pump stations, utility rooms, cross-passages, ventilation structures) and other areas shall be supervised by automatic fire alarm systems.

**7.4.7.2.1** Automatic fire detection systems for zoned deluge fixed water-based fire-fighting systems within a tunnel shall be zoned to correspond with the fixed water-based fire-fighting system zones.

**7.4.7.2.2** Automatic fire detection systems within a tunnel shall be zoned to correspond with the tunnel ventilation zones if tunnel ventilation is provided.

**4807.8 NFPA 502 Section 7.5.** Modify NFPA 502 Section 7.5 through 7.5.2 to read as follows:

**7.5\* Emergency ~~((Communications Systems)) Responder Radio Coverage. ~~((Two-Way Radio Communication Enhancement System.))~~~~**

**7.5.1** ~~((Two-way radio communication enhancement)) Emergency Responder Radio Coverage systems shall be installed in new and existing tunnels and ancillary facilities ~~((where))~~ if required by the authority having jurisdiction, ~~((or by other applicable governing laws, codes, or standards.))~~~~

**7.5.2** ~~((Two-way radio communication enhancement)) Emergency Responder Radio Coverage systems shall be designed, installed, tested, and maintained in accordance with the provisions of ~~((NFPA 72, National Fire Alarm and Signaling Code))~~ NFPA 1225 (2022), *Standard Emergency Services Communications* and Section 510 of the 2021 *Seattle Fire Code*.~~

**4807.9 NFPA 502 Section 7.7.** Modify NFPA 502 Section 7.7 to read as follows:

**7.7 ~~((Fire Apparatus)) Fire Command Center. ~~((Reserved))~~~~** If required by the authority having jurisdiction, road tunnels shall be provided with a fire command center in accordance with Section 508 of the 2021 *Seattle Fire Code*.

\*\*\*

**4807.10 NFPA 502 Section 7.16.1.1.** Modify NFPA 502 Section 7.16.1.1 to read as follows:

**7.16.1.1\*** The means of egress requirements for all road tunnels and those roadways beneath air-right structures that the authority having jurisdiction determines are similar to a road tunnel shall be in accordance with ~~((NFPA 101, Chapter 7))~~ Chapter 10 of the 2021 *Seattle Building Code*, except as modified by this standard.

\*\*\*

**4807.10 NFPA 502 Section 7.16.3.** Modify NFPA 502 Section 7.16.3 to read as follows:

**7.16.3 Maintenance.** The means of egress shall be maintained in accordance with ~~((NFPA 4))~~ Chapter 10 of the 2021 *Seattle Fire Code*.

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### **4807.11 NFPA 502 Section 7.16.6.4.** Modify NFPA 502 Section 7.16.6.4 to read as follows:

**7.16.6.4** The emergency exits shall be separated from the tunnel by a minimum of a 2-hour fire-rated construction enclosure, ~~((based on the time-temperature curve described in 7.3.2))~~ in accordance with the 2021 *Seattle Building Code*.

\*\*\*

## Chapter 9 Fixed Water-Based Fire-Fighting Systems

### **4809.1 NFPA 502 Section 9.1.** Modify NFPA 502 Section 9.1 to read as follows:

#### **9.1\* General.**

**9.1.1** Fixed water-based fire-fighting systems (FFFS) ~~((shall be permitted))~~ are required in road tunnels as part of an integrated approach to the management of fire protection and fire-life safety risks.

### **4809.2 NFPA 502 Section 9.1.2.** Modify NFPA 502 Section 9.1.2 to read as follows:

**9.1.2** ~~((When a FFFS is installed in road tunnels, it))~~ The FFFS shall be installed, inspected, and maintained in accordance with ((NFPA 11,)) NFPA 13 and NFPA 25. ((, NFPA 15, NFPA 16, NFPA 18, NFPA 18A, NFPA 25, and NFPA 750 or other equivalent international standards.))

### **4809.3 NFPA 502 Section 9.1.2.1.** Add new NFPA 502 Section 9.1.2.1 to read as follows:

**9.1.2.1** Minimum protection of the roadway shall be in accordance with NFPA 13 for Extra Hazard Group 2. If flammable liquids and/or hazardous materials will be present, protection shall be based on an engineering analysis and *approved by the authority having jurisdiction*.

### **4809.4 NFPA 502 Section 9.1.2.2.** Add new NFPA 502 Section 9.1.2.2 to read as follows:

**9.1.2.2** Protection of electrical rooms and mechanical spaces shall be in accordance with NFPA 13 for Ordinary Hazard Group 1.

### **4809.5 NFPA 502 Section 9.1.2.3.** Add new NFPA 502 Section 9.1.2.3 to read as follows:

**9.1.2.3** Protection of exit enclosures shall be in accordance with NFPA 13 for Light Hazard.

### **4809.6 NFPA 502 Sections 9.2 through 9.2.2.4.** Delete NFPA 502 Sections 9.2 through 9.2.2.4:

#### ~~((9.2 Design Objectives:~~

~~**9.2.1** The goal of an FFFS shall be to slow, stop, or reverse the rate of fire growth rate or otherwise mitigate the impact of fire to improve tenability for tunnel occupants during a fire condition, enhance the ability of first responders to aid in evacuation and engage in manual fire fighting activities, and/or protect the major structural elements of a tunnel.~~

~~**9.2.2\*** Fixed water-based fire-fighting systems shall be categorized based upon their desired performance objective in 9.2.2.1 through 9.2.2.4.~~

~~**9.2.2.1\*** **Fire Suppression System.** Fire suppression is the reduction in the heat release rate of a fire by a sufficient application of water. Fire size shall remain reduced over the design discharge duration.~~

~~**9.2.2.2\*** **Fire Control System.** Fire control systems shall be designed to stop or significantly slow the growth of a fire within a reasonable period from system activation such that the peak heat release rate is significantly less than would be expected without a fixed fire fighting system.~~

~~**9.2.2.3\*** **Volume Cooling System.** Volume cooling systems shall be designed to provide substantial cooling of products of combustion but are not intended to directly affect heat release rate.~~

~~**9.2.2.4\*** **Surface Cooling System.** Surface cooling systems shall be designed to provide direct cooling of critical structure, equipment, or appurtenances without directly affecting heat release rate.))~~

### **4809.7 NFPA 502 Sections 9.4 through 9.4.3.** Delete Sections 9.4 through 9.4.3:

#### ~~((9.4 Performance Evaluation:~~

~~**9.4.1** Fire test protocols shall be designed to address the performance objectives as described in 9.2.2 and the tunnel parameters described in Section 9.4.~~

~~**9.4.2\*** Fire test protocols shall be designed to replicate and evaluate the range of the application parameters associated with road tunnels.~~

~~**9.4.3\*** System components shall be listed or as approved by the AHJ.))~~

\*\*\*

**4809.8 NFPA 502 Sections 9.5 through 9.7.1.** Delete Sections 9.5 through 9.7.1:

**~~((9.5 Tunnel Parameters:~~**

~~9.5.1 Tunnel parameters shall be the features of the tunnel that affect the design of a water-based fire fighting system.~~

~~9.5.2 Tunnel Geometry.~~ The tunnel geometry (width, ceiling height, obstruction location) shall be considered when selecting such parameters as nozzle location and nozzle positioning.

~~9.5.3 Ventilation.~~ Ventilation considerations shall include natural and fire-induced forced ventilation parameters.

~~9.5.4 Hazard Analysis.~~ A fire hazard analysis shall be conducted to determine both the design parameters of the water-based fire fighting system and the type of detection and activation scheme employed. The water-based fire fighting system shall address the anticipated vehicle types and contents, ease of ignition and re-ignition of the fuel, anticipated fire growth rate, and difficulty of achieving one or more of the performance objectives established in Section 9.2 or as otherwise acceptable to the AHJ.

~~9.5.5 Obstructions and Shielding.~~ The presence of obstructions and the potential for shielding of water-based firefighting system discharge shall be addressed to ensure that system performance is not affected.

~~9.5.6 Ambient Conditions.~~ The range of ambient conditions that could be experienced in the tunnel shall be identified.

**~~9.6 System Design and Installation Documentation:~~**

~~9.6.1~~ The system design and installation documentation shall identify the design objectives and tunnel parameters over which the system performance evaluation is valid.

~~9.6.2~~ System documentation shall clearly identify engineering safety factors incorporated into the overall system design. Safety factors shall be required to ensure that installed system performance exceeds the performance of the system as tested in accordance with Section 9.3.

~~9.6.3~~ System documentation shall also include recommended testing, inspection, and maintenance procedures and, by reference, the requirements of the relevant NFPA standard or equivalent standard acceptable to the AHJ.

**~~9.7 Engineering Design Requirements:~~**

~~9.7.1\*~~ When an FFFS is included as part of the overall design of a road tunnel, the impact of this system on other measures being part of the overall safety concept shall be evaluated. At a minimum, this evaluation shall address the following:

- ~~(1)~~ Impact on drainage requirements
- ~~(2)~~ Impact on tenability, including the following:
  - ~~(a)~~ Increase in humidity
  - ~~(b)~~ Reduction (if any) in stratification and visibility
- ~~(3)~~ Integration with other tunnel systems, including the following:
  - ~~(a)~~ Fire detection and alarm system
  - ~~(b)~~ Tunnel ventilation system
  - ~~(c)~~ Traffic control and monitoring systems
  - ~~(d)~~ Visible emergency alarm notification
  - ~~(e)~~ Protection of structural elements
- ~~(4)~~ Incident command structure and procedures, including the following:
  - ~~(a)~~ Procedures for tunnel operators
  - ~~(b)~~ Procedures for first responders
  - ~~(c)~~ Tactical fire fighting procedures
- ~~(5)~~ Protection and reliability of the fixed water-based firefighting system, including the following:
  - ~~(a)~~ Impact events
  - ~~(b)~~ Seismic events
  - ~~(c)~~ Redundancy requirements
- ~~(6)~~ Ongoing system maintenance, periodic testing, and service requirements))

\*\*\*

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■ **4810.1 NFPA 502 Chapter 10.** Modify NFPA 502 Section 10.1.4.3 to read as follows:

**Chapter 10 Hydrants, Water Supply and Standpipe Systems**

10.1.4.3 ((Heat trace material shall be listed for the intended purpose and supervised for power loss.)) Heat tracing systems for freeze protection for standpipes shall be in accordance with Seattle Fire Department Administrative Rule 9.03.20, *Automatic Sprinkler and Standpipe Systems*, and any future revisions of this rule adopted by the authority having jurisdiction.

\*\*\*

■ **4810.2 NFPA 502 Section 10.2.3.** Modify NFPA 502 Section 10.2.3 to read as follows:

10.2.3 ((Acceptable water supplies shall include the following:

- (1) Municipal or privately owned waterworks systems that have adequate pressure and flow rate and a level of integrity acceptable to the AHJ
- (2) Automatic or manually controlled fire pumps that are connected to an approved water source
- (3) Pressure type or gravity type storage tanks that are installed, inspected, and maintained in accordance with NFPA 22))

Standpipes shall be sized to provide 1000 gpm. Hydraulic calculations shall be based on 500 gpm at 130 psi at the hydraulically most remote hose connection, with a simultaneous flow of 500 gpm at the next hydraulically most remote hose connection. The maximum calculated pressure at any point in the system shall not exceed 350 psi.

\*\*\*

■ **4810.3 NFPA 502 Section 10.3.1.** Modify NFPA 502 Section 10.3.1 to read as follows:

10.3.1 Fire department connections shall be of the threaded ((two-way, three-way or four-way)) 65-mm (2-1/2-in) four-way type, ((or shall consist of at least one minimum 100 mm (4 in.) quick-connect coupling that is accessible and compatible with responding fire department equipment or as approved.))

\*\*\*

■ **4810.4 NFPA 502 Section 10.4.2.** Modify NFPA 502 Section 10.4.2 to read as follows:

10.4.2\* ((Hose connection spacing shall not exceed 85 m (275 ft.)) Dual 65-mm (2-1/2-in) standpipe hose connection outlets having separate valves shall be provided at each standpipe hose connection location.

\*\*\*

■ **4810.5 NFPA 502 Section 10.7.** Add new NFPA 502 Section 10.7 to read as follows:

**10.7 Fire Hydrants and Water Supply.**

10.7.1 Fire hydrants for limited access and depressed highways shall be provided at spacing not to exceed 304 800 mm (1,000 ft) to provide for transportation hazards.

10.7.2 Fire hydrants for roadways beneath air-right structures, bridges, and elevated highways shall be provided so that no location on the protected roadway is more than 90 m (300 ft) from a fire hydrant.

10.7.3 Fire hydrants for road tunnels shall be provided so that no location on the protected roadway is more than 45 m (150 ft) from a fire hydrant.

10.7.4 The water supply for fire hydrants shall provide a minimum of 1,000 gpm (63 L/s) at 20 psi (138 kPa) flowing independently, and a minimum of 1,500 gpm (34 L/s) at 20 psi (138 kPa) with two fire hydrants flowing simultaneously.

■ **4810.8 NFPA 502 Section 10.8.** Add new NFPA 502 Section 10.8 to read as follows:

**10.8 Bridges and Elevated Highways.**

10.8.1 Fire hydrants for bridges and elevated highways shall be provided in accordance with this section and Section 10.7.

10.8.2 If median dividers and/ or four or more traffic lanes are present, fire hydrants for bridges and elevated highways shall be provided on both sides of the roadway at the required spacing or installed in the median divider at the required spacing.

10.8.3 Fire hydrants for bridges and elevated highways shall have two 100 mm (4 in) hose connection outlets, with external threads in accordance with City of Seattle Standard Plan No. 310a, and each outlet provided with a hand-operable valve readily accessible from the roadway.

10.8.4 The hose connection outlets shall be oriented parallel to the roadway and face in both directions of travel.

**Exception:** The outlets may be angled in towards the roadway at an angle not exceeding 22.5 degrees.

10.8.5 Hose connection outlets shall be positioned such that the centerline of each outlet is installed not more than 400 mm (16 in) horizontally from the inside edge of the top and not less than 200 mm (8 in) above the top of the guardrail or edge barrier, and not more than 1370 mm (54 in) above the roadway.

10.8.6 Hose connection outlets shall be provided with caps that are removable with a standard hydrant wrench.

10.8.7 Hose connection caps shall be provided with a 3 mm (1/8 in) hose and be secured with a short length of chain or cable to prevent falling after removal.

10.8.8 Water shall be supplied to bridge and elevated highways hydrants by the use of *approved* manually actuated preaction or deluge valves installed in locations not subject to freezing, such as in underground vaults or other *approved* locations.

10.8.9 Access to the preaction or deluge valves and manual actuation capability at the valve locations shall be provided, including access key box if the water supply vault will be locked.

10.8.10 A preaction or deluge valve actuation device (such as an electrical switch, push button, manual pull station, etc.) shall be installed at each hydrant location and be protected from damage in a weatherproof enclosure that can be opened without the use of tools or special knowledge, or with a standard hydrant wrench, or other *approved* method.

10.8.11 The location of the preaction or deluge valve actuation switch installed at each hydrant shall be readily visible and have *approved* signage.

10.8.12 A means to indicate that the system is in the tripped condition such as a light beacon or remote monitoring of the system shall be provided.

10.8.13 Hydrant systems for bridges and elevated highways shall have provisions for complete draining after use.

10.8.14 Combination air relief/vacuum valves shall be installed at each high point on the system.

10.8.15 Water supply vault location information, vault access instructions, and a phone number for road crew to drain the system shall be provided at the roadway control panel push button locations.

10.8.16 If used, heat tracing systems for freeze protection for hydrant systems shall be in accordance with Seattle Fire Department Administrative Rule 9.03.17, *Automatic Sprinkler and Standpipe Systems* and any future revisions of this rule adopted by the authority having jurisdiction.

**4810.9 NFPA 502 Section 10.9.** Add new NFPA 502 Section 10.9 to read as follows:

**10.9 Maintenance and Confidence Testing.**

10.9.1 Standpipe and hydrant systems shall be inspected and tested at least annually.

10.9.2 Maintenance and periodic testing are the owner's responsibility, or the responsibility of such other person as may be designated by the owner, and are separate from the fire department inspections.

10.9.3 The person, fire or corporation performing such work shall have a Type STP-1 certificate from the Seattle Fire Department. See Administrative Rule 9.01.20, *Certificates of Competency for Installing, Inspecting, Testing and Maintaining Fire Protection Systems*, and Administrative Rule 9.02.19, *Inspection, Testing, Maintenance and Reporting Requirements for Fire Protection Systems and Emergency Responder Amplification Systems*.

**4810.10 NFPA 502 Section 10.10.** Add new NFPA 502 Section 10.10 to read as follows:

**10.10 Standpipe Installation in Tunnels Under Construction.**

10.10.1 A standpipe system shall be installed in tunnels under construction in accordance with 10.10.1.1 and 10.10.1.2.

10.10.1.1 A standpipe system shall be installed before the tunnel under construction has exceeded a length of 61 m (200 ft) of the most remote portion of the tunnel.

10.10.1.2 Standpipes shall be sized for *approved* water flow and pressure at the outlet, based upon the maximum predicted fire load.

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## Chapter 11 Emergency Ventilation

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**4811.1 NFPA 502 Section 11.1.** Add new NFPA 502 Sections 11.1.1.1 through 11.1.1.3 to read as follows:

11.1.1.1 If an engineering analysis is not conducted, or does not support the use of natural ventilation for the configurations described in 11.1.1, a mechanical emergency ventilation system shall be provided.

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11.1.1.2 The engineering analysis of the ventilation system shall include a validated subway analytical simulation program augmented as appropriate by a quantitative analysis of airflow dynamics produced in the fire scenario, such as would result from the application of validated computational fluid dynamics techniques.

11.1.1.3 The results of the analysis shall include the no-fire (or cold) air velocities that can be measured during commissioning to confirm that a mechanical ventilation system as built meets the requirements determined by the analysis.

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## Chapter 12 Electrical Systems

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### 4812.1 NFPA 502 Section 12.4. Modify NFPA 502 Sections 12.4 through 12.4.1 to read as follows:

**12.4\* Emergency Power.** Road tunnels (~~(complying with Category B-D in Section 7.2)~~) shall be provided with (~~emergency power~~) a Class 2, Type 60, Level 1 Emergency Power Supply System (EPSS) in accordance with Article 700 of NFPA 70 and Chapter 4 of NFPA 110. (~~(For emergency and standby power systems, other than separate service, see NFPA 110.))~~)

**12.4.1** The following systems shall be connected to the emergency power supply system:

- (1) Emergency (~~(lighting)~~) voice/alarm communication systems
- (2) Tunnel closure and traffic control system(s)
- (3) Exit signs and means of egress illumination
- (4) (~~(Emergency communication)~~) Lighting for mechanical rooms
- (5) Tunnel drainage system(s)
- (6) Emergency ventilation and automatic fire detection equipment for pressurized stairways.
- (7) Automatic Fire alarm and detection
- (8) Closed-circuit television or video system(s) and security system(s)
- (9) (~~(Fire fighting)~~) Smoke control systems
- (10) Electrically powered fire pumps
- (11) Power and lighting for the fire command center
- (12) Fire alarm systems

\*\*\*

## Chapter 13 Emergency Response

### 4813.1 NFPA 502 Section 13.5.2. Modify NFPA 502 Section 13.5.2 to read as follows:

**13.5.2\*** The OCC (~~(shall)~~) may serve as a supervising station to allow direct receipt of alarms, where approved by the authority having jurisdiction.

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### 4813.2 NFPA 502 Section 13.8.6. Modify NFPA 502 Section 13.8.6 to read as follows:

**13.8.6 Limited Access Highways and Road Tunnels.**

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### 4814.1 NFPA 502 Section 14.1. Modify NFPA 502 Sections 14.1 through 14.1.6.1 to read as follows:

## Chapter 14 Regulated and Unregulated Cargoes

### 14.1 General.

**14.1.1\*** (~~(The authority having jurisdiction (AHJ) shall adopt rules and regulations that apply to the transportation of regulated and unregulated cargoes.))~~ This chapter applies to the transportation of hazardous materials through road tunnels as follows:

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- (1) If the tunnel length equals or exceeds 240 m (800 ft) and if the maximum distance from any point with the tunnel to an area of safety exceeds 120 m (400 ft).
- (2) If the tunnel length equals or exceeds 300 m (1000 ft).

### **Exceptions:**

- (1) The existing Mount Baker Tunnel (Interstate-90) and the Washington State Convention and Trade Center lid (Interstate-5) if the foam-water fire protection system(s) are fully functional and in-service.
- (2) Fuel contained in the fuel system of the transporting vehicle, or in the fuel systems of vehicles and equipment being towed or carried.

**14.1.2** (~~Design and planning of the facility shall address the potential risk presented by regulated and unregulated cargoes as permitted by 14.1.1.~~) Vehicles transporting hazardous materials in quantities that require DOT placards in accordance with 49 CFR are prohibited in road tunnels.

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**14.1.4** Flames used for heating vehicles or loads shall be extinguished before the vehicle enters the road tunnel or its approaches.

**14.1.5** Tank vehicles that are empty, or that have a residue, or vehicles transporting empty containers are prohibited from entering road tunnels if they previously transported the following hazardous materials:

- (1) Class 1 explosives, division 1.1, 1.1, and 1.3;
- (2) Class 2, division 2.3 poisonous gas;
- (3) Class 4, division 4.3 dangerous when wet materials;
- (4) Class 6, division 6.1 poisonous materials marked PG I (Inhalation Hazard), or PG III (Stow Away From Foodstuffs).

### **Exceptions:**

1. Tank vehicles or containers that have been sufficiently clean of residue and purged of vapor to remove an potential hazard;
2. Tank vehicles or containers that have been reloaded with a material not classified as a hazardous material.

**14.1.6** Alternative-fuel vehicles powered by liquefied petroleum gas (LPG), liquefied natural gas (LNG) or compressed natural gas (CNG) are permitted if the vehicle meets any one of the following:

- (1) Vehicle has a dedicated alternative-fuel system installed by the manufacturer of the vehicle.
- (2) Vehicle has a fuel system that has been properly converted to an alternative fuel system.
- (3) Vehicle alternative-fuel system conforms to one of the following industry standards:
  - (a) NFPA 52 – Standard for Compressed Natural Gas (CNG) Vehicular Fuel Systems, which is incorporated by reference; or
  - (b) NFPA 58 – Standard for the Storage and Handling of Liquefied Petroleum Gases (LPG), which is incorporated by reference.
- (4) Vehicle alternative-fuel system conforms to applicable federal regulations.
- (5) Fuel capacity of the vehicle does not exceed 300 pounds water capacity.

**14.1.6.1** Alternative-fuel vehicles shall display all markings and symbols required by law to identify the alternative-fuel system.

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## **Annex A Explanatory Material**

**4816.1 NFPA 502 Annex A.12.4.** Modify NFPA 502 Annex Section 12.4 to read as follows:

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**A.12.4** It is expected that the operations of all systems within the vicinity of a fire can fail. Section 12.4 is intended to limit the area of such failure. The class defines the minimum time, in hours, that the Emergency Power Supply System (EPSS) is designed to operate at its rated load without being refueled or recharged. The type defines the maximum time, in seconds,



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that the EPSS will permit the load terminals of the transfer switch to be without acceptable electrical power. NFPA 110 recognizes two levels of EPSS equipment installation, performance and maintenance. Level 1 systems shall be installed if failure of the EPSS to perform could result in loss of human life or serious injuries.

\* \* \*

## [W] CHAPTER 49

# FIXED GUIDEWAY TRANSIT AND PASSENGER RAIL SYSTEMS

**User note:**

*About this chapter:* This chapter is unique to Washington State.

### SECTION 4901 FIXED GUIDEWAY TRANSIT AND PASSENGER RAIL SYSTEMS

[S] **4901.1 Scope NFPA 130.** General. Fixed guideway transit and passenger rail systems shall be in accordance with NFPA 130-2020, as modified below.

[S] **4901.1.1 NFPA 130 Section 1.3.4.** Modify NFPA 130 Section 1.3.4 as follows:

**1.3.4** This standard ~~((shall also apply))~~ applies as a basis for fixed guideway transit and passenger rail systems ~~((where))~~ if nonelectric and combination electric-other (such as diesel) vehicles are used. ~~((Where))~~ If such vehicles are not passenger carrying vehicles or are buses or ~~((trolley coaches))~~ street cars, the standard ~~((shall))~~ does not apply to those vehicles but ~~((shall))~~ does apply to the fixed guideway transit and passenger rail systems in which such vehicles are used.

[S] **4901.1.2 NFPA 130 Section 3.2.2.** Modify NFPA 130 Section 3.2.2 as follows:

**3.2.2\* Authority Having Jurisdiction (AHJ).** ~~((An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.))~~ The fire chief or other designated authority charged with the administration of the fire code, or a duly authorized representative.

**4901.2 NFPA 130 Section 3.3.44.2.** Add new definition as follows:

**3.3.44.2 Traction power substation (TPSS):** A TPSS is an electrical substation consisting of switchgear transformers/rectifiers, emergency trip equipment, and other systems that converts AC electric power provided by the electrical power industry for public utility service to DC voltage to supply light rail vehicles with traction current.

[S] **4901.2.1 NFPA 130 Section 4.4.1.1.** Add new definition as follows:

**4.4.1.1 Emergency power assumptions.** The emergency power requirements in this standard assume a fire or other emergency event within the station or trainway concurrent with a power outage of the primary source of electrical power unrelated to the event within the transit system.

[S] **4901.2.1.1 NFPA 130 Section 4.4.2.** Modify NFPA 130 Section 4.4.2 as follows:

**4.4.2\* Fire Scenarios.** Design scenarios shall consider the location and size of a fire or a fire-related emergency and shall be approved.

[S] **4901.2.2 NFPA 130 Section 5.1.2.3.** Add a new Section NFPA 130 Section 5.1.2.3 as follows:

**5.1.2.3** Fixed guideway transit and passenger rail stations shall comply with the applicable provisions of Section 1114 of the 2021 *Seattle Building Code*.

[S] **4901.2.3 NFPA 130 Section 5.1.3.1.1.** Add a new Section NFPA 130 Section 5.1.3.1.1 as follows:

**5.1.3.1.1** Fixed guideway transit and passenger rail station platforms are classified as Group A, Division 3 occupancies in accordance with the 2021 *Seattle Building Code* and 2021 *Seattle Fire Code*.

[S] **4901.2.4 NFPA 130 Section 5.2.1.1.** Modify NFPA 130 Section 5.2.1.1 as follows:

**5.2.1.1** During the course of construction, provisions of NFPA 241 and Chapter 33 of the 2021 *Seattle Fire Code* and Chapter 33 of the 2021 *Seattle Building Code* ~~((shall))~~ apply. ~~((except as modified herein.))~~

[S] ~~((4901.6))~~ **4901.2.5 NFPA 130 Section 5.2.2.2.** Modify NFPA 130 Section 5.2.2.2 as follows:

**5.2.2.2** Construction types shall conform to the requirements in ~~((NFPA 220))~~ the *International Building Code*, Chapter 6, unless otherwise exempted in this section.

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**Table 5.2.2.1  
Minimum Construction Requirements for New Station Structures**

Station Configuration	Construction Type†
Stations erected entirely above grade and in a separate building:	
Open stations	Type IIB
Enclosed stations	Type IIA
Stations erected entirely or partially below grade:	
Open above grade portions of below grade structures*	Type IIA
Below grade portions of structures	Type IB
Below grade structures with occupant loads exceeding 1000	Type IA

\* Roofs not supporting an occupancy above are not required to have a fire resistance rating.

† Construction types are in accordance with the International Building Code.

**[S] 4901.2.6 NFPA Section 5.2.4.1.** Modify NFPA 130 Section 5.2.4.1 as follows:

**5.2.4.1 Interconnected Floor Levels.** Interconnection between floor levels in stations shall be permitted as follows:

- (1) \*Stairs and escalators regularly used by passengers for circulation during normal revenue service in enclosed stations equipped throughout with an automatic sprinkler system (~~(shall not be)~~) are not required to be fire-separated if the station is constructed in accordance with Chapter 7 of the 2021 *Seattle Building Code*. All required exit stairs in enclosed stations shall be enclosed in accordance with Chapter 10 of the 2021 *Seattle Building Code*.
- (2) Public areas on different levels in open stations are permitted to be interconnected.
- (3) Public areas on different levels in enclosed stations shall be permitted to be interconnected, provided fire separation is not required for smoke control or other fire protection purposes.

**[S] 4901.2.6.1 NFPA Section 5.2.4.2.** Modify NFPA 130 Section 5.2.4.2 as follows:

**5.2.4.2\* Separation Between Public and Nonpublic Floor Areas.** All public areas shall be fire-separated from adjacent nonpublic areas by 5.2.4.3 through 5.2.4.5.

**[S] (~~4901.7~~) 4901.2.6.2.** NFPA 130 Section 5.2.2. Modify NFPA 130 Section 5.2.4.3 as follows:

**5.2.4.3 Ancillary spaces.** Fire resistance ratings of separations between ancillary occupancies shall be established as required for accessory occupancies and incidental uses by (~~(NFPA 101)~~) the International Building Code and in accordance with ASTM E119 and ANSI/UL 263.

**[S] (~~4901.8~~) 4901.2.6.3 NFPA 130 Section 5.2.5.4.** Modify NFPA 130 Section 5.2.5.4 as follows:

**5.2.5.4** Materials used as interior finish in open stations shall comply with the requirements of (~~(NFPA 101, Chapter 12)~~) the International Building Code, Chapter 8.

**[S] 4901.2.6.4 NFPA 130 Section 5.2.7.2.** Modify NFPA 130 Section 5.2.7.2 as follows:

**5.2.7.2\*** Permanent rubbish containers in the station shall (~~(be manufactured of noncombustible materials)~~) comply with Section 304.3 of the 2021 *Seattle Fire Code*.

**[S] (~~4901.9~~) 4901.2.6.5 NFPA 130 Section 5.3.1.1.** Modify NFPA 130 Section 5.3.1.1 as follows:

**5.3.1.1** The provisions for means of egress for a station shall comply with (~~(Chapter 7 and 12 of NFPA 101)~~) the International Building Code, Chapter 10, except as herein modified.

**[S] 4901.2.6.6 NFPA 130 Section 5.3.2.1.** Modify NFPA 130 Section 5.3.2.1 as follows:

**5.3.2.1\*** The occupant load for a station shall be based on the train load of trains simultaneously entering the station on all tracks in normal traffic direction plus the simultaneous entraining load awaiting trains. For below grade (including retained cut) stations, the calculated occupant load derived from the analysis above cannot be less than the occupant load based upon one occupant per 7 sq. ft. (net) (0.7 m<sup>2</sup>) applied to the platforms.

- (1) The train load shall consider only one train at any one track, inside a station.
- (2) The basis for calculating train and entraining loads shall be the peak period ridership figures as projected for design of a new system or as updated for an operating system.

**[S] (~~4901.10~~) 4901.2.6.7 NFPA 130 Section 5.3.2.2.1.** Add a New Section to NFPA 130 Section 5.3.2.2.1 as follows:

**5.3.2.2.1** Where station occupancy is anticipated to be greater than design capacity during a major event the operating agency shall initiate *approved* measures to restrict access to the station, when required by the *fire code official*, to ensure existing means of egress are adequate as an alternate to account for peak ridership associated with major events.

[S] ~~((4901.14))~~ **4901.2.6.8 NFPA 130 Section 5.3.2.4.** Modify NFPA 130 Section 5.3.2.4 as follows:

**5.3.2.4** ~~((Where))~~ If an area within a station is intended for use by other than passengers or employees, the following parameters shall apply:

1. The occupant load for that area shall be determined in accordance with the provisions of ~~((NFPA 101))~~ the International Building Code as appropriate for the use.
2. The additional occupant load shall be included in determining the required egress from that area.
3. The additional occupant load shall be permitted to be omitted from the station occupant load where the area has independent means of egress of sufficient number and capacity.

[S] ~~((4901.12))~~ **4901.2.6.9 NFPA 130 Section 5.3.3.4.** Modify NFPA 130 Section 5.3.3.4 as follows:

**5.3.3.4 Travel distance.** For open stations the maximum travel distance on the platform to a point at which a means of egress route leaves the platform shall not exceed 100 m (325 ft.). For enclosed stations the travel distance to an exit shall not exceed 76 m (250 ft.).

[S] **4901.2.6.10 NFPA 130 Section 5.3.3.6.** Modify NFPA 130 Section 5.3.3.6 as follows:

**5.3.3.6 Alternate Egress.** At least two means of egress remote from each other shall be provided from each station platform as follows:

~~((1)\* A means of egress used as a public circulation route shall be permitted to provide more than 50 percent of the required egress capacity from a station platform or other location.~~

~~((2))~~ (1) Means of egress from separate platforms shall be permitted to converge.

~~((3))~~ (2) Where means of egress routes from separate platforms converge, the subsequent capacity of the egress route shall be sufficient to maintain the required evacuation time from the incident platform.

[S] **4901.2.6.11 NFPA 130 Section 5.3.3.8.** Add a new Section to NFPA 130 Section 5.3.3.8 as follows:

**5.3.3.8** Required interior exit stairways in enclosed stations serving floor levels more than 30 feet (9144 mm) below its level of exit discharge shall comply with the requirements for a pressurized stairway in Section 909.20.5 of the 2021 Seattle Building Code.

[S] ~~((4901.13))~~ **4901.2.6.12 NFPA 130 Section 5.3.5.4.** Modify NFPA 130 Section 5.3.5.4 as follows:

~~((5.3.5.4 Escalators shall not account for more than one half of the egress capacity at any one level.))~~

[S] ~~((4901.14))~~ **4901.2.6.13 NFPA 130 Section 5.3.5.5.** Delete NFPA 130 Section 5.3.5.5.

~~((5.3.5.5 Escalators shall be permitted to account for more than one half of the required egress capacity at any one level where the following criteria are met:~~

- ~~(1) The escalators are capable of being remotely brought to a stop in accordance with the requirements of 5.3.5.7(3)(b), 5.3.5.7(4), and 5.3.5.7(5).~~
- ~~(2) A portion of the egress capacity from each station level is stairs.~~
- ~~(3) For enclosed stations, at least one enclosed exit provides continuous access from the platforms to the public way.))~~

[S] **4901.2.6.14 NFPA 130 Section 5.3.5.6 through 5.3.5.10.** Delete NFPA 130 Section 5.3.5.6 through 5.3.5.10:

~~((5.3.5.6\* In calculating the egress capacity of escalators, the following criteria shall be met:~~

- ~~1. One escalator at each level shall be considered as being out of service.~~
- ~~2. The escalator chosen shall be the one having the most adverse effect upon egress capacity.~~

~~5.3.5.7 Where escalators are permitted as a means of egress in stations, the following criteria shall be met:~~

- ~~1.\* The escalators shall be constructed of noncombustible materials.~~
- ~~2.\* Escalators running in the direction of egress shall be permitted to remain operating.~~
- ~~3. Escalators running reverse to the direction of egress shall be capable of being stopped locally and remotely as follows:~~
  - ~~a. Locally by a manual stopping device at the escalator.~~
  - ~~b. Remotely by one of the following:~~
    - ~~i. A manual stopping device at a remote location.~~
    - ~~ii. As part of a preplanned evacuation response.~~

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- 4.\* Where provision is made for remote stopping of escalators counted as means of egress, one of the following shall apply:
- a. The stop shall be delayed until it is preceded by a minimum 15-second audible signal or warning message sounded at the escalator.
  - b. Where escalators are equipped with the necessary controls to decelerate in a controlled manner under the full rated load, the stop shall be delayed for at least 5 seconds before beginning deceleration, and the deceleration rate shall be no greater than 0.052 m/sec<sup>2</sup> (0.17 ft/sec<sup>2</sup>).
5. Where an audible signal or warning message is used, the following shall apply:
- a. The signal or message shall have a sound intensity that is at least 15 dBA above the average ambient sound level for the entire length of the escalator.
  - b. The signal shall be distinct from the fire alarm signal.
  - e. The warning message shall meet audibility and intelligibility requirements.

~~5.3.5.8 Escalators with or without intermediate landings shall be acceptable as a means of egress, regardless of vertical rise.~~

~~5.3.5.9 Escalators exposed to the outdoor environment shall be provided with slip-resistant landing and floor plates, and if they are exposed to freezing temperatures, the landing and floor plates and the steps shall be heated to prevent the accumulation of ice and snow.~~

~~5.3.5.10 Stopped escalators shall be permitted to be started in the direction of egress in accordance with the requirements for stopping of escalators described in 5.3.5.7(3), 5.3.5.7(4), and 5.3.5.7(5), provided that the escalators can be restarted in a fully loaded condition and that passengers are given warning.~~)

**[S]4901.2.6.15 NFPA 130 Section 5.3.6 through 5.3.6.4. Delete NFPA 130 Section 5.3.6 through 5.3.6.4:**

~~**(5.3.6 Elevators.**~~

~~5.3.6.1 Elevators meeting the requirements of 5.3.6.2 through 5.3.6.4 shall be permitted to account for part of the means of egress capacity in stations.~~

~~5.3.6.2 Capacity. Where elevators are counted as contributing to the means of egress capacity, the following shall apply:~~

- ~~(1) They shall account for no more than 50 percent of the required egress capacity.~~
- ~~(2)\* At least one elevator shall be considered out of service, and one elevator shall be reserved for fire service.~~
- ~~(3)\* The capacity of each elevator shall be the carrying capacity of the elevator within 30 minutes.~~

~~5.3.6.3 Holding Area. Elevators counted as contributing to the means of egress capacity from any level of a station shall be accessed via holding areas or lobbies at that level, which shall be designed as follows:~~

- ~~(1) The holding areas or lobbies shall be separated from the platform by a smoketight fire separation having a fire resistance rating of at least 1 hour but not less than the time required to evacuate the holding area occupant load.~~
- ~~(2) At least one stair shall be accessible from the holding area.~~
- ~~(3) The holding area shall be sized to accommodate one person per 0.46 m<sup>2</sup> (5 ft<sup>2</sup>).~~
- ~~(4) If the holding area includes portions of the platform, the area within 460 mm (18 in.) of the trainway shall not be considered in the calculation.~~
- ~~(5) Upon activation of smoke control in the platform or adjacent trainway areas, the holding area shall be pressurized to a minimum of 25 Pa (0.1003 in. of water gauge).~~
- ~~(6) The holding area shall be provided with emergency voice alarm devices with two-way communication to the system operations control center.~~

~~5.3.6.4 Design Features. Elevators counted as contributing to the means of egress capacity shall be designed as follows:~~

- ~~(1) Shaft enclosures shall be constructed as fire separations having a 2-hour fire resistance rating.~~
- ~~(2)\* The design shall limit water flow into the shaft.~~
- ~~(3) No more than two elevators used for means of egress or fire department access shall share the same machine room.~~
- ~~(4) Machine rooms shall be separated from each other by fire separations having a minimum fire resistance rating of 2 hours.~~
- ~~(5) The elevators shall be connected to emergency power.~~
- ~~(6)\* During emergency evacuation, the elevators shall travel only between the incident level and a point of safety.~~

(7)\* Provisions for Phase I emergency recall operation shall be based on analysis of fire scenarios on each level served and demonstrate safe egress for those scenarios.)

[S] ~~((4901.15))~~ **4901.2.6.16 NFPA 130 Section 5.3.7.** Modify NFPA 130 Section 5.3.7.1 through 5.3.7.2.1 as follows:  
**5.3.7\* Doors, gates, security grilles, and exit hatches.**

**5.3.7.1** The egress capacity for doors and gates in a means of egress serving public areas shall be computed as follows:

1. ~~((60))~~ Sixty people per minute (p/min) for single leaf doors and gates.

2.\* 0.0819 p/mm-min (2.08 p/in.-min) for bi-parting multileaf doors and gates measured for the clear width dimension.

**5.3.7.2** Gates in a means of egress shall be designed in accordance with the requirements for doors serving as a means of egress in accordance with Section 1010.3.4.1 of the 2021 *Seattle Building Code* and maintain the clear width of the exit walkway.

**5.3.7.2.1** Security grilles are allowed when designed and operated in accordance with the IBC.

[S] **4901.2.6.17 NFPA 130 Section 5.3.8.5.** Modify NFPA 130 Section 5.3.8.5 as follows:

**5.3.8.5** Turnstile-type fare barriers shall be permitted in accordance with ~~((NFPA 101))~~ Chapter 10 of the 2021 *Seattle Building Code* and shall be permitted in the means of egress and shall meet the following criteria:

(1) Dimensions shall be in accordance with the requirements of ~~((NFPA 101))~~ Chapter 10 of the 2021 *Seattle Building Code*.

(2) Turnstiles that drop away from the egress opening under the conditions listed in 5.3.8.2 or 5.3.8.3 shall be credited with a capacity of 50 p/min for egress calculations.

(3) Turnstiles that revolve freely in the direction of egress under the conditions listed in 5.3.8.2 shall meet the following criteria:

(a) Each unit shall be credited with a capacity of 25 p/min for egress calculations.

(b) The turnstiles shall not account for more than 50 percent of the required egress capacity for each egress route.

[S] ~~((4901.16))~~ **4901.2.6.18 NFPA 160 Section 5.3.9.** Modify NFPA 130 Section 5.3.9 as follows:

**5.3.9\* Horizontal exits.** Horizontal exits ~~((compliant with NFPA 101))~~ shall ~~((be permitted for up to 100 percent of the number of exits and required egress capacity provided that not more than 50 percent of the number and required capacity is into a single building))~~ comply with International Building Code Section 1026.

[S] ~~((4901.17))~~ **4901.2.6.19 NFPA 130 Section 5.3.11.** Modify NFPA 130 Section 5.3.11.1 and 5.3.11.2 as follows:

**5.3.11 Means of egress lighting.**

**5.3.11.1** Illumination of the means of egress in stations, including escalators that are considered a means of egress, shall be in accordance with ~~((Section 7.8 of NFPA 101))~~ International Building Code Section 1008.

**5.3.11.2** Means of egress, including escalators considered as means of egress, shall be provided with a system of emergency lighting in accordance with ~~((Section 7.9 of NFPA 101))~~ the International Building Code Section 1008.

[S] **4901.3 NFPA 130 Section 5.4.1.1.** Modify NFPA 130 Section 5.4.1.1 as follows:

**5.4.1\* Fire Command Center.**

**5.4.1.1** Enclosed stations shall be provided with a fire command center in accordance with NFPA 72 and Section 508 of the 2021 Seattle Fire Code.

[S] **4901.4 NFPA 130 Section 5.4.2.5.** Modify NFPA 130 Section 5.4.2.5 as follows:

**5.4.2.5** When activated, fire alarm, smoke detection, valve switches, and waterflow signals shall be transmitted simultaneously to the local station and to the operations control center. (See also Chapter 10). An Operations Control Center per 9.6 shall be used to supervise these systems and devices.

[S] ~~((4901.3))~~ **4901.5 NFPA 130 Section 5.4.4.** Modify NFPA 130 Sections 5.4.4.1 and new Section 5.4.4.1.1 to read as follows:

**5.4.4.1\*** An automatic sprinkler ~~((protection))~~ system shall be provided ~~((in areas of stations used for concessions, in storage areas, in trash rooms, and other similar areas with combustible loadings, except trainways))~~ throughout enclosed stations.

**EXCEPTIONS:**

1. Traction power substation (TPSS) when located in a transformer vault designed in accordance with the NFPA 70.

2. Other high voltage equipment located in a transformer vault designed in accordance with the NFPA 70 when approved by the fire code official.

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3. Fire command centers, unoccupied communication room(s), and unoccupied signal rooms when protected with clean agent fire suppression and separated from other spaces with two-hour fire rated construction.
4. Other rooms, critical to station operation, when protected with alternative automatic fire-extinguishing systems and separated from other spaces with two-hour fire rated construction, when *approved by the fire code official*.

5.4.4.1.1 An automatic sprinkler system shall be provided in areas of open stations used for concessions, markets, storage areas and similar areas with combustible loadings, and in trash rooms, electrical rooms, mechanical rooms, machinery rooms, communication rooms, and other enclosed rooms.

**EXCEPTIONS:**

1. Stations at grade with less than 1,500 sq. ft. (139 m<sup>2</sup>) of ancillary area/ancillary space.
2. Fire command centers, unoccupied communication room(s), and unoccupied signal rooms when protected with alternative automatic fire-extinguishing systems and separated from other spaces with two-hour fire rated construction.
3. Other rooms, critical to station operation, when protected with clean agent fire suppression and separated from other spaces with two-hour fire rated construction, when *approved by the fire code official*.

**[S]4901.5.1 NFPA 130 Section 5.4.4.2.** Modify NFPA 130 Section 5.4.4.2 as follows:

5.4.4.2 Sprinkler protection shall be permitted to be omitted in areas of open stations (~~remotely located from public spaces~~) separated from the station by a distance of 20 feet (6096 mm), where allowed by the *fire code official*.

**[S]4901.5.2 NFPA 130 Section 5.4.4.5.** Modify NFPA 130 Section 5.4.4.5 as follows:

5.4.4.5 Other fire suppression systems, if *approved*, shall be permitted to be substituted for automatic sprinkler systems in the areas listed in 5.4.4.1 and 5.4.4.1.1.

**[S] ((4901.4)) 4901.5.3 NFPA 130 Section 5.4.5.** Modify NFPA 130 Section 5.4.5.1 as follows:

5.4.5.1 Class I standpipes shall be installed in enclosed stations in accordance with ((NFPA 14)) International Fire Code Section 905 except as modified herein and any other area as required by the *fire code official*.

**[S] 4901.5.4 NFPA 130 Section 5.4.5.3.1.** Add a new Section to NFPA 130 Section 5.4.5.3.1 as follows:

5.4.5.3.1 Hydraulic design information signs shall be provided at each fire department connection indicating the residual inlet pumping pressure(s) required for the hydraulically most remote and/or other selected hose connection outlet location(s).

**[S] 4901.5.5 NFPA 130 Section 5.4.5.4.** Modify NFPA 130 Section 5.4.5.4 as follows:

5.4.5.4 Standpipes shall be permitted to be of the dry type with the approval of the authority having jurisdiction provided the following requirements are met:

1. Systems shall be installed in a manner so that the water is delivered to all hose connections on the system in 10 minutes or less.
2. Combination air relief-vacuum valves shall be installed at each high point in the system.

**Exception:** Combination air relief-vacuum valves are not required at fire department connections located at a high point of the system.

**[S] 4901.5.6 NFPA 130 Sections 5.4.5.8 through 5.4.5.10.** Add new Sections 5.4.5.8 through 5.4.5.10 to NFPA 130 as follows:

5.4.5.8 The standpipe system shall be designed to provide 1000 gpm at 130 psi. The 1000 consists of the two most remote hose connections flowing 500 gpm each.

5.4.5.9 Isolation valves on the standpipe are permitted to be locked in the open position in lieu of being electronically monitored.

5.4.5.10 Pressure regulating devices are not required per Section 7.2.3.2 of NFPA 14.

**[S] ((4901.5)) 4901.5.7 NFPA 130 Section 5.4.6.** Modify NFPA 130 Sections 5.4.6 and 5.4.6.1 as follows:

5.4.6 Portable Fire Extinguishers. Portable fire extinguishers in such number, size, type, and location ((as determined by the authority having jurisdiction)) shall be provided in accordance with the International Fire Code Section 906.

5.4.6.1 Where required, portable fire extinguishers shall be selected, installed, inspected, tested, and maintained in accordance with NFPA 10. Portable fire extinguishers are not required in public areas of at-grade stations.

**[S] ((4901.6)) 4901.5.8 NFPA 130 Section 5.4.7.** Modify NFPA 130 Section 5.4.7 and add a new section 5.4.7.1.1 as follows:

5.4.7 Emergency ventilation shall be provided in enclosed stations in accordance with Chapter 7 and the International Building Code Section 909.

**5.4.7.1.1 Smoke control system.** A smoke control system shall be provided in underground fixed guideway transit and passenger rail stations in accordance with Section 909 of the 2021 *Seattle Building Code*. Smoke control shall restrict movement of smoke to the general area of fire origin and non-occupied exhaust areas and maintain tenability in the means of egress.

[S] **4901.6 NFPA 130 Section 5.4.8.** Modify NFPA 130 Section 5.4.8, 5.4.8.1 and 5.4.8.5 as follows:

**5.4.8 Emergency Power Supply System (EPSS)**

**5.4.8.1** ((Emergency power)) A Class 2, Type U or 10, Level 1 Emergency Power Supply System (EPSS) in accordance with Article 700 of *NFPA 70* and Chapter 4 of NFPA 110 shall be provided for underground and enclosed stations.

**5.4.8.5** Systems connected to the emergency power system shall include the following and shall comply with rules promulgated by the fire code official:

- (1) Emergency lighting
- (2) Protective signaling systems
- (3) Emergency communication system
- (4) Fire command center
- (5) Elevators providing required egress capacity [see 5.3.6.4(5)]

[S] **4901.7 NFPA 130 Section 6.3.1.4.** Modify NFPA 130 Section 6.3.1.4 as follows:

**6.3.1.4\*** Within enclosed trainways, the maximum distance between exits shall not exceed ((762)) 244 m (((2500)) 800 ft).

[S] **4901.7.1 NFPA 130 Section 6.3.2.1.** Modify NFPA 130 Section 6.3.2.1 as follows:

**6.3.2.1\*** The means of egress within the trainway shall be provided with an unobstructed clear width graduating from ((610 mm (24 in.))) 760 mm (30 in.) at the walking surface to ((760 mm (30 in.))) 910 mm (36 in.) at 1575 mm (62 in.) above the walking surface to ((430 mm (17 in.))) 760 mm (30 in.) at 2025 mm (80 in.) above the walking surface.

[S] **4901.7.2 NFPA 130 Section 6.3.2.3.** Delete NFPA 130 Section 6.3.2.3.

((6.3.2.3\* The width of exit stairs shall not be required to exceed 1120 mm (44 in.) for enclosed trainways.))

[S] **4901.7.3 NFPA 130 Section 6.3.3.10.** Modify NFPA 130 Section 6.3.3.10 as follows:

**6.3.3.10** Exit stairs and doors shall comply with Chapter ((7 of NFPA 101,)) 10 of the 2021 *Seattle Building Code*, except as herein modified.

[S] **4901.7.4 NFPA 130 Section 6.3.3.15 through 6.3.3.17.** Delete NFPA 130 Sections 6.3.3.15 through 6.3.3.17.

((6.3.3.15 Exit hatches shall be permitted in the means of egress, provided the following conditions are met:

- (1) Hatches shall be equipped with a manual opening device that can be readily opened from the egress side.
- (2) Hatches shall be operable with not more than one releasing operation.
- (3) The force required to open the hatch when applied at the opening device shall not exceed 130 N (30 lb).
- (4) The hatch shall be equipped with a hold-open device that automatically latches the door in the open position to prevent accidental closure.

~~6.3.3.16 Exit hatches shall be capable of being opened from the discharge side to permit access by authorized personnel.~~

~~6.3.3.17\* Exit hatches shall be conspicuously marked on the discharge side to prevent possible blockage.))~~

[S] **4901.7.5 NFPA 130 Section 6.3.5.12.** Modify NFPA 130 Section 6.3.5.12 as follows:

**6.3.5.12** Lighting systems for enclosed trainways shall be installed in accordance with ((Sections 7.8 and 7.9 of NFPA 101)) Chapter 10 of the 2021 *Seattle Building Code*, except as otherwise noted in 6.3.5.

[S] **4901.8 NFPA 130 Section 6.4.5.1.** Modify NFPA 130 Section 6.4.5.1 as follows:

**6.4.5.1** An *approved* fire standpipe system shall be provided ((in enclosed)) for trainways where physical factors prevent or impede access to the water supply or fire apparatus, ((where)) if required by the authority having jurisdiction.

[S] **4901.8.1 NFPA 130 Section 6.4.5.4.** Modify NFPA 130 Section 6.4.5.4 as follows:

**6.4.5.4** Standpipes shall be permitted to be of the dry type with the approval of the authority having jurisdiction provided the following requirements are met:

1. Systems shall be installed in a manner so that the water is delivered to all hose connections on the system in 10 minutes or less.
2. Combination air relief-vacuum valves shall be installed at each high point in the system.

**Exception:** Air relief-vacuum valves are not required at fire department connections located at a high point of the system.



**FIXED GUIDEWAY TRANSIT AND PASSENGER RAIL SYSTEMS**

**[S] 4901.8.2 NFPA 130 Section 6.4.5.9.1.** Add new NFPA 130 Section 6.4.5.9.1 as follows:

6.4.5.9.1 Hydraulic design information signs shall be provided at each fire department connection indicating the residual inlet pumping pressure(s) required for the hydraulically most remote and/or other selected hose connection outlet location(s).

**[S] 4901.8.3 NFPA 130 Section 6.4.5.11.** Add new NFPA 130 Sections 6.4.5.11 and 6.4.5.11.1 as follows:

6.4.5.11 Four-way 2-1/2-inch (64 mm) fire department connections shall be provided at all emergency access points.

6.4.5.11.1 The trainway standpipe system shall be provided with hose connections every 200 ft. (60 960 mm) on each egress walkway.

**[S] 4901.8.4 NFPA 130 Section 6.4.5.12 through 6.4.5.13.1.** Add new NFPA 130 Sections 6.4.5.12 through 6.4.5.13.1 as follows:

6.4.5.12 Standpipes shall be sized to provide 1000 gpm. Hydraulic calculations shall be based on 500 gpm at 130 psi at the hydraulically most remote hose connection, with a simultaneous flow of 500 gpm at the next hydraulically most remote hose connection. The maximum calculated pressure at any point in the system shall not exceed 350 psi.

6.4.5.13 Standpipes shall be interconnected at all tunnel cross passageways and within the trainway, with isolation valves provided for each interconnection, unless an alternative design is *approved by the fire code official*.

6.4.5.13.1 Isolation valves on the standpipe are permitted to be locked in the open position in lieu of being electronically monitored. Standpipe isolation valves must be accessible.

**[S] 4901.8.5 NFPA 130 Section 6.4.8. and 6.4.8.1** Modify NFPA 130 Section 6.4.8 and 6.4.8.1 as follows.

**6.4.8 Emergency Power Supply System (EPSS).**

6.4.8.1 Enclosed trainways shall be ((such that, in the event of failure of the normal supply to or within the system, emergency power shall be)) provided with a Class 2, Type U or 10, Level 1 Emergency Power Supply System (EPSS) in accordance with Article 700 of NFPA 70 and Chapter 4 of NFPA 110. The supply system for emergency purposes, in addition to the normal services to the trainway, shall be one or more of the types of systems described in 700.12(A) through 700.12(E) of NFPA 70.

**[S] 4901.9 NFPA 130 Section 10.3.1 and 10.3.2.** Modify NFPA 130 Section 10.3.1 and 10.3.2 as follows:

10.3.1 ((Enclosed)) If required by the AHJ, underground and enclosed stations and trainways shall be provided with a public radio enhancement system.

10.3.2 Radio coverage shall be provided throughout enclosed stations as a percentage of floor area as specified in NFPA ((+224)) 1225.

**[S] 4901.9.1 NFPA 130 Section 10.4.1.1.** Add new NFPA 130 Sections 10.4.1.1 as follows:

10.4.1.1 If required by the authority having jurisdiction, stations shall be provided with an *approved* Emergency Services Communication System in accordance with the 2022 edition of NFPA 1225.

**[S] 4901.10 NFPA 130 Section 12.4.1.** Modify NFPA 130 Section 12.4.1 as follows:

12.4.1 Conduits, raceways, ducts, boxes, cabinets, and equipment enclosures shall be constructed of noncombustible materials. In stations, guideways and tunnels, other *approved* materials when encased in concrete shall be acceptable.

## Part V—Hazardous Materials

### CHAPTER 50

## HAZARDOUS MATERIALS—GENERAL PROVISIONS

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**User note:**

**About this chapter:** Chapter 50 contains the general requirements for all hazardous materials in all occupancies. Hazardous materials are defined as those that pose an unreasonable risk to the health and safety of operating or emergency personnel, the public and the environment if not properly controlled during handling, storage, manufacture, processing, packaging, use, disposal or transportation. The general provisions of this chapter are intended to be companion provisions with the specific requirements of Chapters 51 through 67 regarding a given hazardous material. Also, Sections 414 and 415 of the International Building Code® contain construction requirements related to the storage and use of such materials.

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### SECTION 5001 GENERAL

[S] **5001.1 Scope.** Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials and notification of biosafety level 3 and biosafety level 4 operations shall be in accordance with this chapter.

This chapter shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

**Exceptions:**

1. In retail or wholesale sales occupancies, medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
2. Alcoholic beverages in retail or wholesale sales occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.
4. The off-site transportation of hazardous materials where in accordance with Department of Transportation (DOTn) regulations.
5. Building materials not otherwise regulated by this code.
6. Refrigeration systems (see Section 608).
7. Stationary storage battery systems regulated by Section 1207.
8. The display, storage, sale or use of fireworks and *explosives* in accordance with Chapter 56.
9. *Corrosives* utilized in personal and household products in the manufacturer's original consumer packaging in Group M occupancies.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. The use of wall-mounted dispensers containing alcohol-based hand rubs classified as Class I or II liquids where in accordance with Section 5705.5.
12. Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.
13. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 605. For abandonment of fuel oil tanks, Chapter 57 applies.
14. Storage and display of aerosol products complying with Chapter 51.
15. Storage and use of *flammable* or *combustible liquids* that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.

## HAZARDOUS MATERIALS—GENERAL PROVISIONS

16. *Flammable or combustible liquids* with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion, not otherwise regulated by this code.
17. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.
18. Hazardous materials at marine terminals in accordance with Administrative Rule 27.01, *Marine Terminals*, and any future revisions of this rule adopted by the *fire code official*.

**5001.1.1 Waiver.** The provisions of this chapter are waived where the *fire code official* determines that such enforcement is preempted by other codes, statutes or ordinances. The details of any action granting such a waiver shall be recorded and entered in the files of the code enforcement agency.

**5001.2 Material classification.** Hazardous materials are those chemicals or substances defined as such in this code. Definitions of hazardous materials shall apply to all hazardous materials, including those materials regulated elsewhere in this code.

**5001.2.1 Mixtures.** Mixtures shall be classified in accordance with hazards of the mixture as a whole. Mixtures of hazardous materials shall be classified in accordance with nationally recognized reference standards; by an *approved* qualified organization, individual, or Safety Data Sheet (SDS); or by other *approved* methods.

**5001.2.2 Hazard categories.** Hazardous materials shall be classified according to hazard categories. The categories include materials regulated by this chapter and materials regulated elsewhere in this code.

**5001.2.2.1 Physical hazards.** The material categories listed in this section are classified as *physical hazards*. A material with a primary classification as a *physical hazard* can also pose a *health hazard*.

1. *Explosives* and blasting agents.
2. *Combustible liquids*.
3. Flammable solids, liquids and gases.
4. Organic peroxide solids or liquids.
5. Oxidizer, solids or liquids.
6. Oxidizing gases.
7. Pyrophoric solids, liquids or gases.
8. Unstable (reactive) solids, liquids or gases.
9. Water-reactive materials solids or liquids.
10. *Cryogenic fluids*.

**5001.2.2.2 Health hazards.** The material categories listed in this section are classified as *health hazards*. A material with a primary classification as a *health hazard* can also pose a *physical hazard*.

1. Highly toxic and toxic materials.
2. *Corrosive* materials.

**5001.3 Performance-based design alternative.** Where *approved* by the *fire code official*, buildings and facilities where hazardous materials are stored, used or handled shall be permitted to comply with this section as an alternative to compliance with the other requirements set forth in this chapter and Chapters 51 through 67.

**5001.3.1 Objective.** The objective of Section 5001.3 is to protect people and property from the consequences of unauthorized discharge, fires or explosions involving hazardous materials.

**5001.3.2 Functional statements.** Performance-based design alternatives are based on the following functional statements:

1. Provide safeguards to minimize the risk of unwanted releases, fires or explosions involving hazardous materials.
2. Provide safeguards to minimize the consequences of an unsafe condition involving hazardous materials during normal operations and in the event of an abnormal condition.

**5001.3.3 Performance requirements.** Where safeguards, systems, documentation, written plans or procedures, audits, process hazards analysis, mitigation measures, engineering controls or construction features are required by Sections 5001.3.3.1 through 5001.3.3.18, the details of the design alternative shall be subject to approval by the *fire code official*. The details of actions granting the use of the design alternatives shall be recorded and entered in the files of the jurisdiction.

**5001.3.3.1 Properties of hazardous materials.** The physical- and health-hazard properties of hazardous materials on-site shall be known and shall be made readily available to employees, neighbors and the *fire code official*.

**5001.3.3.2 Reliability of equipment and operations.** Equipment and operations involving hazardous materials shall be designed, installed and maintained to ensure that they reliably operate as intended.

## HAZARDOUS MATERIALS—GENERAL PROVISIONS

4. Facility evacuation meeting point locations.
5. The general purpose of other areas within the building.
6. Location of all above-ground and underground tanks and their appurtenances including, but not limited to, sumps, vaults, below-grade treatment systems and piping.
7. The hazard classes in each area.
8. Locations of all *control areas* and Group H occupancies.
9. Emergency *exits*.

**[S] 5001.5.2 Hazardous Materials Inventory Statement (HMIS).** Where required by the *fire code official*, an application for or renewal of a permit shall include an HMIS (~~(, such as Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III, Tier II Report or other approved statement. The HMIS shall))~~ that includes the following information:

1. Product name.
2. Component.
3. Chemical Abstract Service (CAS) number.
4. Location where stored or used.
5. Container size.
6. Hazard classification.
7. Amount in storage.
8. Amount in use-*closed systems*.
9. Amount in use-*open systems*.

### **5001.5.2 Point of Information**

Prior to developing an HMIS, please contact the Special Hazards Unit of the Fire Prevention Division for specific guidelines, format and assistance.

**5001.6 Facility closure.** Facilities shall be placed out of service in accordance with Sections 5001.6.1 through 5001.6.3.

**5001.6.1 Temporarily out-of-service facilities.** Facilities that are temporarily out of service shall continue to maintain a permit and be monitored and inspected.

**5001.6.2 Permanently out-of-service facilities.** Facilities for which a permit is not kept current or is not monitored and inspected on a regular basis shall be deemed to be permanently out of service and shall be closed in an *approved* manner. Where required by the *fire code official*, permittees shall apply for approval to close permanently storage, use or handling facilities. The *fire code official* is authorized to require that such application be accompanied by an *approved* facility closure plan in accordance with Section 5001.6.3.

**5001.6.3 Facility closure plan.** Where a facility closure plan is required in accordance with Section 5001.5 to terminate storage, dispensing, handling or use of hazardous materials, it shall be submitted to the *fire code official* not less than 30 days prior to facility closure. The plan shall demonstrate that hazardous materials that are stored, dispensed, handled or used in the facility will be transported, disposed of or reused in a manner that eliminates the need for further maintenance and any threat to public health and safety.

**[S] 5001.7 Biosafety level 3 and biosafety level 4 operations.** The *fire code official* shall be notified in writing annually of locations where biosafety level 3 (BSL-3) or biosafety level 4 (BSL-4) operations as defined by the U.S. Department of Health and Human Services Centers for Disease Control and Prevention and National Institutes of Health (CDC/NIH) are being performed. Such notification shall identify the location(s) within the building where BSL-3 and BSL-4 operations are conducted and shall certify compliance with the CDC/NIH's recommended practices for such operations.

## SECTION 5002 DEFINITIONS

**[S] 5002.1 Definitions.** The following terms are defined in Chapter 2:

**BOILING POINT.**

**CEILING LIMIT.**

**CHEMICAL.**

**CHEMICAL NAME.**

**CLOSED CONTAINER.**

CONTAINER.  
CONTROL AREA.  
CYLINDER.  
DAY BOX.  
DEFLAGRATION.  
DESIGN PRESSURE.  
DETACHED BUILDING.  
DISPENSING.  
EXCESS FLOW CONTROL.  
EXHAUSTED ENCLOSURE.  
EXPLOSION.  
FLAMMABLE VAPORS OR FUMES.  
GAS CABINET.  
GAS ROOM.  
HANDLING.  
HAZARDOUS MATERIALS.  
HEALTH HAZARD.  
IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).  
INCOMPATIBLE MATERIALS.  
LIQUID.  
LOWER EXPLOSIVE LIMIT (LEL).  
LOWER FLAMMABLE LIMIT (LFL).  
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA.  
NON-PRODUCTION LABORATORY FACILITY.  
NORMAL TEMPERATURE AND PRESSURE (NTP).  
OUTDOOR CONTROL AREA.  
PERMISSIBLE EXPOSURE LIMIT (PEL).  
PESTICIDE.  
PHYSICAL HAZARD.  
PRESSURE VESSEL.  
SAFETY CAN.  
SAFETY DATA SHEET (SDS).  
SECONDARY CONTAINMENT.  
SEGREGATED.  
SOLID.  
STORAGE, HAZARDOUS MATERIALS.  
SYSTEM.  
TANK, ATMOSPHERIC.  
TANK, PORTABLE.  
TANK, STATIONARY.  
TANK VEHICLE.  
UNAUTHORIZED DISCHARGE.  
USE (MATERIAL).  
VAPOR PRESSURE.

**HAZARDOUS MATERIALS—GENERAL PROVISIONS**

**SECTION 5003  
GENERAL REQUIREMENTS**

**5003.1 Scope.** The storage, use and handling of all hazardous materials shall be in accordance with this section.

**[S] 5003.1.1 Maximum allowable quantity per control area.** The *maximum allowable quantity per control area* shall be as specified in Tables 5003.1.1(1) through 5003.1.1(4).

For retail and wholesale storage and display in Group M occupancies and Group S storage, see Section 5003.11. Non-production laboratory facilities may be in accordance with Section 5003.13.

**5003.1.2 Conversion.** Where quantities are indicated in pounds and where the weight per gallon of the liquid is not provided to the *fire code official*, a conversion factor of 10 pounds per gallon (1.2 kg/L) shall be used.

**5003.1.3 Quantities not exceeding the maximum allowable quantity per control area.** The storage, use and handling of hazardous materials in quantities not exceeding the *maximum allowable quantity per control area* indicated in Tables 5003.1.1(1) through 5003.1.1(4) shall be in accordance with Sections 5001 and 5003.

**5003.1.4 Quantities exceeding the maximum allowable quantity per control area.** The storage and use of hazardous materials in quantities exceeding the *maximum allowable quantity per control area* indicated in Tables 5003.1.1(1) through 5003.1.1(4) shall be in accordance with this chapter.

**TABLE 5003.1.1(4)**  
**MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS**  
**POSING A HEALTH HAZARD IN AN OUTDOOR CONTROL AREA<sup>a, b, c, f</sup>**

MATERIAL	STORAGE			USE-CLOSED SYSTEMS			USE-OPEN SYSTEMS	
	Solid pounds	Liquid gallons (pounds)	Gas cubic feet at NTP (pounds)	Solid pounds	Liquid gallons (pounds)	Gas cubic feet at NTP (pounds)	Solid pounds	Liquid gallons (pounds)
Corrosives	20,000	2,000	Gaseous 1,620 Liquefied (300)	10,000	1,000	Gaseous 810 Liquefied (150)	1,000	100
Highly toxics	20	(20)	Gaseous 40 <sup>d</sup> Liquefied (8) <sup>d</sup>	10	(10)	Gaseous 20 <sup>d</sup> Liquefied (4) <sup>d</sup>	3	(3)
Toxics	1,000	(1,000) <sup>e</sup>	Gaseous 1,620 Liquefied (300)	500	50 <sup>e</sup>	Gaseous 810 Liquefied (150)	125	(125) <sup>e</sup>

For SI: 1 cubic foot = 0.02832 m<sup>3</sup>, 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 pound per square inch absolute = 6.895 kPa, °C = (°F - 32)/1.8.

- For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.
- The aggregate quantities in storage and use shall not exceed the quantity listed for storage.
- The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.
- Allowed only where used in *approved* exhausted gas cabinets, exhausted enclosures or under fume hoods.
- The maximum allowable quantity per control area for toxic liquids with vapor pressures in excess of 1 psia at 77°F shall be the maximum allowable quantity per control area listed for highly toxic liquids.
- Quantities in parentheses indicate quantity units in parentheses at the head of each column.

**5003.2 Systems, equipment and processes.** Systems, equipment and processes utilized for storage, dispensing, use or handling of hazardous materials shall be in accordance with Sections 5003.2.1 through 5003.2.9.

**5003.2.1 Design and construction of containers, cylinders and tanks.** Containers, cylinders and tanks shall be designed and constructed in accordance with *approved* standards. Containers, cylinders, tanks and other means used for containment of hazardous materials shall be of an *approved* type. Pressure vessels not meeting DOTn requirements for transportation shall comply with the *ASME Boiler and Pressure Vessel Code*.

**[S] 5003.2.2 Piping, tubing, valves and fittings.** Piping, tubing, valves, and fittings conveying hazardous materials shall be designed and installed in accordance with ASME B31.1 or other *approved* standards, the Seattle Plumbing Code, and shall be in accordance with Sections 5003.2.2.1 and 5003.2.2.2.

**5003.2.2.1 Design and construction.** Piping, tubing, valves, fittings and related components used for hazardous materials shall be in accordance with the following:

- Piping, tubing, valves, fittings and related components shall be designed and fabricated from materials that are compatible with the material to be contained and shall be of adequate strength and durability to withstand the pressure, structural and seismic stress and exposure to which they are subject.
- Piping and tubing shall be identified in accordance with ASME A13.1 to indicate the material conveyed.
- Manual valves or automatic remotely activated fail-safe emergency shutoff valves shall be installed on supply piping and tubing and provided with *ready access* at the following locations:
  - The point of use.
  - The tank, cylinder or bulk source.
- Manual emergency shutoff valves and controls for remotely activated emergency shutoff valves shall be clearly visible, provided with *ready access* and identified in an *approved* manner.
- Backflow prevention or check valves shall be provided where the backflow of hazardous materials could create a hazardous condition or cause the unauthorized discharge of hazardous materials.

**Exceptions:**

- Piping for inlet connections designed to prevent backflow.
- Piping for pressure relief devices.

**5003.2.2.2 Additional regulations for supply piping for health-hazard materials.** Supply piping and tubing for gases and liquids having a health-hazard ranking of 3 or 4 in accordance with NFPA 704 shall be in accordance with ASME B31.3 and the following:

- Piping and tubing utilized for the transmission of highly toxic, toxic or highly volatile *corrosive* liquids and gases shall have welded, threaded or flanged connections throughout except for connections located within a ventilated

- c. Limited to Division 1.4 materials and articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles, providing the net explosive weight of individual articles does not exceed 1 pound.
- d. Detached buildings are not required for gases in gas rooms that support H-5 fabrication facilities where the gas room is separated from other areas by a fire barrier with a fire-resistance rating of not less than 2 hours and the gas is located in a gas cabinet that is internally sprinklered, equipped with continuous leak detection, automatic shutdown, and is not manifolded upstream of pressure controls. The gas supply is limited to cylinders that do not exceed 125 pounds water capacity in accordance with DOTn 49 CFR 173.192 for Hazard Zone A toxic gases.

**5003.8.3 Control areas.** *Control areas* shall comply with Sections 5003.8.3.1 through 5003.8.3.5.3.

**Exception:** Higher education laboratories in accordance with Chapter 38 of this code and Section 428 of the *International Building Code*.

**5003.8.3.1 Construction requirements.** *Control areas* shall be separated from each other by *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both.

**[S] 5003.8.3.2 Percentage of maximum allowable quantities.** The percentage of maximum allowable quantities of hazardous materials per *control area* allowed at each story within a building shall be in accordance with Table 5003.8.3.2.

**Exception:** *Non-production laboratory facilities* are permitted to be in accordance with Section 5003.13.

**TABLE 5003.8.3.2  
DESIGN AND NUMBER OF CONTROL AREAS**

STORY		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA <sup>a</sup>	NUMBER OF CONTROL AREAS PER STORY	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS <sup>b</sup>
Above grade plane	Higher than 9	5	1	2
	7-9	5	2	2
	6	12.5	2	2
	5	12.5	2	2
	4	12.5	2	2
	3	50	2	1
	2	75	3	1
Below grade plane	1	100	4	1
	1	75	3	1
	2	50	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 5003.1.1(1) and 5003.1.1(2), with all increases allowed in the footnotes to those tables.

b. Separation shall include fire barriers and horizontal assemblies as necessary to provide separation from other portions of the building.

**[S] 5003.8.3.3 Number.** The maximum number of *control areas* per floor within a building shall be in accordance with Table 5003.8.3.2. For the purposes of determining the number of *control areas* within a building, each portion of a building separated by one or more *fire walls* complying with Section 706 of the *International Building Code* shall be considered a separate building.

**Exception:** *Non-production laboratory facilities* are permitted to be in accordance with Section 5003.13.

**[S] 5003.8.3.4 Fire-resistance-rating requirements.** The required *fire-resistance rating* for *fire barriers* shall be in accordance with Table 5003.8.3.2 or Table 5003.13 for *non-production laboratory facilities*. The floor assembly of the *control area* and the construction supporting the floor of the *control area* shall have a *fire-resistance rating* of not less than 2 hours.

**Exception:** The floor assembly of the *control area* and the construction supporting the floor of the *control area* is allowed to be 1-hour *fire-resistance* rated in buildings of Types IIA, IIIA, IV and VA construction, provided that both of the following conditions exist:

1. The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. The building is three stories or less above *grade plane*.

**5003.8.3.5 Hazardous materials in Group M display and storage areas and in Group S storage areas.** Hazardous materials located in Group M and Group S occupancies shall be in accordance with Sections 5003.8.3.5.1 through 5003.8.3.5.3.



[S] TABLE 5003.11.1  
MAXIMUM ALLOWABLE QUANTITY PER INDOOR AND OUTDOOR CONTROL AREA IN GROUP M  
AND S OCCUPANCIES—NONFLAMMABLE SOLIDS, NONFLAMMABLE AND NONCOMBUSTIBLE LIQUIDS<sup>d, e, f</sup>

CONDITION		MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
Material <sup>a</sup>	Class	Solids (pounds)	Liquids (gallons)
<b>A. Health-Hazard Materials—Nonflammable and Noncombustible Solids and Liquids</b>			
1. Corrosives <sup>b, c</sup>	Not Applicable	9,750	975
2. Highly toxics	Not Applicable	20 <sup>b, c</sup>	2 <sup>b, c</sup>
3. Toxics <sup>b, c</sup>	Not Applicable <sup>k</sup>	1,000 <sup>k</sup>	100
<b>B. Physical-Hazard Materials—Nonflammable and Noncombustible Solids and Liquids</b>			
1. Oxidizers <sup>b, c</sup>	4	Not Allowed	Not Allowed
	3	1,350 <sup>g</sup>	135
	2	2,250 <sup>h</sup>	225
	1	18,000 <sup>i, j</sup>	1,800 <sup>i, j</sup>
2. Unstable (reactives) <sup>b, c</sup>	4	Not Allowed	Not Allowed
	3	550	55
	2	1,150	115
	1	Not Limited	Not Limited
3. Water reactives	3 <sup>b, c</sup>	550	55
	2 <sup>b, c</sup>	1,150	115
	1	Not Limited	Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m<sup>3</sup>.

- a. Hazard categories are as specified in Section 5001.2.2.
- b. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an *approved* automatic sprinkler system in accordance with Section 903.3.1.1. Where Note c applies, the increase for both notes shall be applied cumulatively.
- c. Maximum allowable quantities shall be increased 100 percent where stored in *approved* storage cabinets in accordance with Section 5003.8. Where Note b applies, the increase for both notes shall be applied cumulatively.
- d. See Table 5003.8.3.2 for design and number of control areas.
- e. Maximum allowable quantities for other hazardous material categories shall be in accordance with Section 5003.1.
- f. Maximum allowable quantities shall be increased 100 percent in outdoor control areas.
- g. Maximum allowable quantities shall be increased to 2,250 pounds where individual packages are in the original sealed containers from the manufacturer or packager and do not exceed 10 pounds each.
- h. Maximum allowable quantities shall be increased to 4,500 pounds where individual packages are in the original sealed containers from the manufacturer or packager and do not exceed 10 pounds each.
- i. Quantities are unlimited where protected by an automatic sprinkler system.
- j. Quantities are unlimited in an outdoor control area.
- k. Maximum allowable quantity of consumer products shall be increased to 10,000 pounds where individual packages are in the original sealed containers from the manufacturer and the toxic classification is exclusively based on the LC<sub>50</sub> threshold and no other hazardous materials classifications apply.

**5003.11.2 Maximum allowable quantity per outdoor control area in Group M or S occupancies.** The aggregate amount of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored and displayed within a single *outdoor control area* of a Group M occupancy shall not exceed the amounts set forth in Table 5003.11.1.

**5003.11.3 Storage and display.** Storage and display shall be in accordance with Sections 5003.11.3.1 through 5003.11.3.11.

**5003.11.3.1 Density.** Storage and display of solids shall not exceed 200 pounds per square foot (976 kg/m<sup>2</sup>) of floor area actually occupied by solid merchandise. Storage and display of liquids shall not exceed 20 gallons per square foot (0.50 L/m<sup>2</sup>) of floor area actually occupied by liquid merchandise.

**5003.11.3.2 Storage and display height.** Display height shall not exceed 6 feet (1829 mm) above the finished floor in display areas of Group M occupancies. Storage height shall not exceed 8 feet (2438 mm) above the finished floor in storage areas of Group M and Group S occupancies.

**5003.11.3.3 Container location.** Individual containers less than 5 gallons (19 L) or less than 25 pounds (11 kg) shall be stored or displayed on pallets, racks or shelves.

**5003.11.3.4 Racks and shelves.** Racks and shelves used for storage or display shall be in accordance with Section 5003.9.9.

**5003.11.3.5 Container type.** Containers shall be *approved* for the intended use and identified as to their content.

**5003.11.3.6 Container size.** Individual containers shall not exceed 100 pounds (45 kg) for solids or 10 gallons (38 L) for liquids in storage and display areas.

**HAZARDOUS MATERIALS—GENERAL PROVISIONS**

**5003.11.3.7 Incompatible materials.** *Incompatible materials* shall be separated in accordance with Section 5003.9.8.

**5003.11.3.8 Floors.** Floors shall be in accordance with Section 5004.12.

**5003.11.3.9 Aisles.** Aisles 4 feet (1219 mm) in width shall be maintained on three sides of the storage or display area.

**5003.11.3.10 Signs.** Hazard identification signs shall be provided in accordance with Section 5003.5.

**5003.11.3.11 Storage plan.** A storage plan illustrating the intended storage arrangement, including the location and dimensions of aisles, and storage racks shall be provided.

**5003.12 Outdoor control areas.** *Outdoor control areas* for hazardous materials shall be in accordance with the following general requirements:

1. *Outdoor control areas* shall be kept free from weeds, debris and common combustible materials not necessary to the storage. The area surrounding an *outdoor control area* shall be kept clear of such materials for not less than 15 feet (4572 mm).
2. *Outdoor control areas* shall be located not closer than 20 feet (6096 mm) from a public street, public alley, *public way* or *lot line* that can be built on.

**Exceptions:**

1. For solid and liquid hazardous materials, a 2-hour *fire-resistance-rated* wall without openings extending not less than 30 inches (762 mm) above and to the sides of the storage area shall be allowed in lieu of such distance.
2. For *compressed gas* hazardous materials, unless otherwise specified, the minimum required distances shall not apply where *fire barriers* without openings or penetrations having a minimum *fire-resistance rating* of 2 hours interrupt the line of sight between the storage and the exposure. The configuration of the *fire barrier* shall be designed to allow natural ventilation to prevent the accumulation of hazardous gas concentrations.
3. Where a property exceeds 10,000 square feet (929 m<sup>2</sup>), a group of two *outdoor control areas* is allowed where *approved* and where each control area is separated by a minimum distance of 50 feet (15 240 mm).
4. Where a property exceeds 35,000 square feet (3252 m<sup>2</sup>), additional groups of *outdoor control areas* are allowed where *approved* and where each group is separated by a minimum distance of 300 feet (91 440 mm).

**[S] 5003.13 Non-production laboratory facilities.** *Non-production laboratory facilities* are permitted to comply with Sections 5003.13.1 through 5003.13.4 in lieu of Section 5003.8.3.

**[S] 5003.13.1 Maximum allowable quantity per control area.** The aggregate amount of hazardous materials in a *control area* shall not exceed the percentage specified in Table 5003.13.

**[S] 5003.13.2 Fire-resistance-rating requirements.** The required fire-resistance-rating for fire barriers shall be in accordance with Table 5003.13 for non-production laboratory facilities.

**[S] 5003.13.3 Storage.** Storage in control areas shall be in accordance with this code and Sections 5003.13.3.1 through 5003.13.3.4.

**[S] 5003.13.3.1 Density.** Storage of Class I flammable liquids shall not exceed 4 gallons per 100 square feet (0.13 L/m<sup>2</sup>) of floor area above floor level 6.

**[S] 5003.13.3.2 Container size.** Individual containers in storage shall not exceed 1 gallon (3.8 L) for Class I flammable liquids.

**[S] 5003.13.4 Automatic sprinkler system.** An *approved* automatic sprinkler system shall be installed throughout a building containing a non-production laboratory facility. The sprinkler system shall be designed to protect an ordinary hazard group 2 occupancy.

**TABLE 5003.13  
DESIGN AND NUMBER OF CONTROL AREAS IN NON-PRODUCTION LABORATORY FACILITIES<sup>a</sup>**

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA <sup>b</sup>	NUMBER OF CONTROL AREAS PER FLOOR	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS <sup>c,d</sup>
Above Grade Plane	Higher than 20	Not Allowed	Not Allowed	Not Allowed
	6 – 20	15	2	2
	5	25	2	2
	4	25	2	2
	3	50	2	2
	2	75	2	1
Below Grade Plane	1	100	2	1
	1	75	2	1
	2	50	2	1
Lower than 2		Not Allowed	Not Allowed	Not Allowed

- a. Table 5003.13 applies to non-production laboratory facilities meeting the criteria of Section 5003.13.
- b. Percentages shall be of the maximum allowable quantity per control area shown in Tables 5003.1.1(1) and 5003.1.1(2), with all increases allowed in the footnotes to those tables.
- c. Fire barriers shall include walls and floors as necessary to provide separation from other portions of the building.
- d. Vertical fire barriers separating control areas from other spaces on the same floor may be one hour rated.

**SECTION 5004  
STORAGE**

**5004.1 Scope.** Storage of hazardous materials in amounts exceeding the *maximum allowable quantity per control area* as set forth in Section 5003.1 shall be in accordance with Sections 5001, 5003 and 5004. Storage of hazardous materials in amounts not exceeding the *maximum allowable quantity per control area* as set forth in Section 5003.1 shall be in accordance with Sections 5001 and 5003. Retail and wholesale storage and display of nonflammable solid and nonflammable and noncombustible liquid hazardous materials in Group M occupancies and Group S storage shall be in accordance with Section 5003.11.

**5004.2 Spill control and secondary containment for liquid and solid hazardous materials.** Rooms, buildings or areas used for the storage of liquid or solid hazardous materials shall be provided with spill control and secondary containment in accordance with Sections 5004.2.1 through 5004.2.3.

**Exception:** Outdoor storage of containers on *approved* containment pallets in accordance with Section 5004.2.3.

**5004.2.1 Spill control for hazardous material liquids.** Rooms, buildings or areas used for the storage of hazardous material liquids in individual vessels having a capacity of more than 55 gallons (208 L), or in which the aggregate capacity of multiple vessels exceeds 1,000 gallons (3785 L), shall be provided with spill control to prevent the flow of liquids to adjoining areas. Floors in indoor locations and similar surfaces in outdoor locations shall be constructed to contain a spill from the largest single vessel by one of the following methods:

1. Liquid-tight sloped or recessed floors in indoor locations or similar areas in outdoor locations.
2. Liquid-tight floors in indoor locations or similar areas in outdoor locations provided with liquid-tight raised or recessed sills or dikes.
3. Sumps and collection systems.
4. Other *approved* engineered systems.

Except for surfacing, the floors, sills, dikes, sumps and collection systems shall be constructed of noncombustible material, and the liquid-tight seal shall be compatible with the material stored. Where liquid-tight sills or dikes are provided, they are not required at perimeter openings having an open-grate trench across the opening that connects to an *approved* collection system.

**5004.2.2 Secondary containment for hazardous material liquids and solids.** Where required by Table 5004.2.2, buildings, rooms or areas used for the storage of hazardous materials liquids or solids shall be provided with secondary containment in accordance with this section where the capacity of an individual vessel or the aggregate capacity of multiple vessels exceeds both of the following:

1. Liquids: Capacity of an individual vessel exceeds 55 gallons (208 L) or the aggregate capacity of multiple vessels exceeds 1,000 gallons (3785 L).
2. Solids: Capacity of an individual vessel exceeds 550 pounds (250 kg) or the aggregate capacity of multiple vessels exceeds 10,000 pounds (4540 kg).

**TABLE 5004.2.2  
REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIAL SOLIDS AND LIQUIDS STORAGE**

MATERIAL	INDOOR STORAGE		OUTDOOR STORAGE		
	Solids	Liquids	Solids	Liquids	
<b>1. Physical-hazard materials</b>					
Combustible liquids	Class II	Not Applicable	See Chapter 57	Not Applicable	See Chapter 57
	Class IIIA		See Chapter 57		See Chapter 57
	Class IIIB		See Chapter 57		See Chapter 57
Cryogenic fluids	See Chapter 55		See Chapter 55		
Explosives	See Chapter 56		See Chapter 56		
Flammable liquids	Class IA	Not Applicable	See Chapter 57	Not Applicable	See Chapter 57
	Class IB		See Chapter 57		See Chapter 57
	Class IC		See Chapter 57		See Chapter 57
Flammable solids	Not Required	Not Applicable	Not Required	Not Applicable	

1. The slope of floors to drains in indoor locations, or similar areas in outdoor locations shall be not less than 1 percent.
2. Drains from indoor storage areas shall be sized to carry the volume of the fire protection water as determined by the design density discharged from the automatic fire-extinguishing system over the minimum required system design area or area of the room or area in which the storage is located, whichever is smaller.
3. Drains from outdoor storage areas shall be sized to carry the volume of the fire flow and the volume of a 24-hour rainfall as determined by a 25-year storm.
4. Materials of construction for drainage systems shall be compatible with the materials stored.
5. *Incompatible materials* used in *open systems* shall be separated from each other in the drainage system.
6. Drains shall terminate in an *approved* location away from buildings, valves, *means of egress*, fire access roadways, adjoining property and storm drains.

**5004.2.3 Containment pallets.** Where used as an alternative to spill control and secondary containment for outdoor storage in accordance with the exception in Section 5004.2, containment pallets shall comply with all of the following:

1. A liquid-tight sump with access for visual inspection shall be provided.
2. The sump shall be designed to contain not less than 66 gallons (250 L).
3. Exposed surfaces shall be compatible with material stored.
4. Containment pallets shall be protected to prevent collection of rainwater within the sump.

**5004.3 Ventilation.** Indoor storage areas and storage buildings shall be provided with mechanical exhaust ventilation or natural ventilation where natural ventilation can be shown to be acceptable for the materials as stored.

**Exceptions:**

1. Storage areas for flammable solids complying with Chapter 59.
2. Storage areas for medical gases complying with Chapter 53.

**5004.3.1 System requirements.** Exhaust ventilation systems shall comply with all of the following:

1. Installation shall be in accordance with the *International Mechanical Code*.
2. Mechanical ventilation shall be at a rate of not less than 1 cubic foot per minute per square foot [ $0.00508 \text{ m}^3/(\text{s} \times \text{m}^2)$ ] of floor area over the storage area.
3. Systems shall operate continuously unless alternative designs are *approved*.
4. A manual shutoff control shall be provided outside of the room in a position adjacent to the access door to the room or in an *approved* location. The switch shall be a break-glass or other *approved* type and shall be labeled: "VENTILATION SYSTEM EMERGENCY SHUTOFF."
5. Exhaust ventilation shall be designed to consider the density of the potential fumes or vapors released. For fumes or vapors that are heavier than air, exhaust shall be taken from a point within 12 inches (305 mm) of the floor. For fumes or vapors that are lighter than air, exhaust shall be taken from a point within 12 inches (305 mm) of the highest point of the room.
6. The location of both the exhaust and inlet air openings shall be designed to provide air movement across all portions of the floor or room to prevent the accumulation of vapors.
7. Exhaust air shall not be recirculated to occupied areas if the materials stored are capable of emitting hazardous vapors and contaminants have not been removed. Air contaminated with explosive or flammable vapors, fumes or dusts; flammable, highly toxic or toxic gases; or radioactive materials shall not be recirculated.

**5004.4 Separation of incompatible hazardous materials.** *Incompatible materials* shall be separated in accordance with Section 5003.9.8.

**5004.5 Automatic sprinkler systems.** Indoor storage areas and storage buildings shall be equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1. The design of the sprinkler system shall be not less than that required for Ordinary Hazard Group 2 with a minimum design area of 3,000 square feet (279 m<sup>2</sup>). Where the materials or storage arrangement are required by other regulations to be provided with a higher level of sprinkler system protection, the higher level of sprinkler system protection shall be provided.

**5004.6 Explosion control.** Indoor storage rooms, areas and buildings shall be provided with explosion control in accordance with Section 911.

**5004.7 Standby or emergency power.** Where mechanical ventilation, treatment systems, temperature control, alarm, detection or other electrically operated systems are required, such systems shall be provided with an emergency or *legally required* standby power in accordance with Section 1203.

**5005.1.4 Limit controls.** Limit controls shall be provided in accordance with Sections 5005.1.4.1 through 5005.1.4.4.

**5005.1.4.1 High-liquid-level control.** Open tanks in which liquid hazardous materials are used shall be equipped with a liquid-level limit control or other means to prevent overfilling of the tank.

**5005.1.4.2 Low-liquid-level control.** *Approved* safeguards shall be provided to prevent a low-liquid level in a tank from creating a hazardous condition, including but not limited to, overheating of a tank or its contents.

**5005.1.4.3 Temperature control.** Temperature control shall be provided in accordance with Section 5004.8.1.

**5005.1.4.4 Pressure control.** Pressure control shall be provided in accordance with Section 5004.8.2.

[S] **5005.1.5 ((Standby)) Legally required standby or emergency power.** Where mechanical ventilation, treatment systems, temperature control, manual alarm, detection or other electrically operated systems are required by this code, such systems shall be provided with emergency or legally required standby power in accordance with Section 1203.

[S] **5005.1.5.1 Exempt applications.** ((Standby)) Legally required standby power for mechanical ventilation, treatment systems and temperature control systems shall not be required where an *approved* fail-safe engineered system is installed.

**5005.1.6 Supervision and monitoring.** Manual alarm, detection and automatic fire-extinguishing systems required by other provisions of Section 5005 shall be electrically supervised and monitored by an *approved* supervisory service or, where *approved*, shall initiate an audible and visual signal at a constantly attended on-site location.

**5005.1.7 Lighting.** Adequate lighting by natural or artificial means shall be provided.

**5005.1.8 Fire protection systems.** Indoor rooms or areas in which hazardous materials are dispensed or used shall be protected by an *automatic sprinkler system* or automatic fire-extinguishing system in accordance with Chapter 9. Sprinkler system design shall be not less than that required for Ordinary Hazard, Group 2, with a minimum design area of 3,000 square feet (279 m<sup>2</sup>). Where the materials or storage arrangement are required by other regulations to be provided with a higher level of sprinkler system protection, the higher level of sprinkler system protection shall be provided.

**5005.1.9 Ventilation.** Indoor dispensing and use areas shall be provided with exhaust ventilation in accordance with Section 5004.3.

**Exception:** Ventilation is not required for dispensing and use of flammable solids other than finely divided particles.

**5005.1.10 Liquid transfer.** Liquids having a hazard ranking of 3 or 4 in accordance with NFPA 704 shall be transferred by one of the following methods:

1. From safety cans complying with UL 30.
2. Through an *approved* closed piping system.
3. From containers or tanks by an *approved* pump taking suction through an opening in the top of the container or tank.
4. From containers or tanks by gravity through an *approved* self-closing or automatic-closing valve where the container or tank and dispensing operations are provided with spill control and secondary containment in accordance with Section 5004.2. Highly toxic liquids shall not be dispensed by gravity from tanks.
5. *Approved* engineered liquid transfer systems.

**Exceptions:**

1. Liquids having a hazard ranking of 4 where dispensed from *approved* containers not exceeding 1.3 gallons (5 L).
2. Liquids having a hazard ranking of 3 where dispensed from *approved* containers not exceeding 5.3 gallons (20 L).

**5005.1.11 Design.** Systems shall be suitable for the use intended and shall be designed by persons competent in such design. Controls shall be designed to prevent materials from entering or leaving the process or reaction system at other than the intended time, rate or path. Where failure of an automatic control could result in a dangerous condition or reaction, the automatic control shall be fail-safe.

**5005.1.12 Emergency isolation.** Where gases or liquids having a hazard ranking of Health Class 3 or 4, Flammability Class 4 or Instability Class 3 or 4 in accordance with NFPA 704 are carried in pressurized piping above 15 pounds per square inch gauge (psig) (103 kPa), an *approved* means of leak detection and emergency shutoff or excess flow control shall be provided. Where the piping originates from within a hazardous material storage room or area, the excess flow control shall be located within the storage room or area. Where the piping originates from a bulk source, the excess flow control shall be located as close to the bulk source as practical.

**Exceptions:**

1. Piping for inlet connections designed to prevent backflow.
2. Piping for pressure relief devices.

TABLE 5005.2.1.4—continued  
REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIAL LIQUIDS USE

MATERIAL	INDOOR LIQUIDS USE	OUTDOOR LIQUIDS USE
2. Health-hazard materials		
Corrosives	Required	Required
Highly toxics		
Toxics		

**5005.2.2 Closed systems.** Use of hazardous materials in closed containers or systems shall be in accordance with Sections 5005.2.2.1 through 5005.2.2.4.

**5005.2.2.1 Ventilation.** Where *closed systems* are designed to be opened as part of normal operations, ventilation shall be provided in accordance with Section 5005.2.1.1.

**5005.2.2.2 Explosion control.** Explosion control shall be provided in accordance with Section 5004.6 where an explosive environment exists because of the hazardous materials dispensed or used, or as a result of the dispensing or use process.

**Exception:** Where process vessels are designed to contain fully the worst-case explosion anticipated within the vessel under process conditions based on the most likely failure.

**5005.2.2.3 Spill control for hazardous material liquids.** Buildings, rooms or areas where hazardous material liquids are used in individual vessels exceeding a 55-gallon (208 L) capacity shall be provided with spill control in accordance with Section 5004.2.1.

**5005.2.2.4 Secondary containment for hazardous material liquids.** Where required by Table 5005.2.1.4, buildings, rooms or areas where hazardous material liquids are used in vessels or systems shall be provided with secondary containment in accordance with Section 5004.2.2 where the capacity of an individual vessel or system or the capacity of multiple vessels or systems exceeds the following:

1. Individual vessel or system: greater than 55 gallons (208 L).
2. Multiple vessels or systems: greater than 1,000 gallons (3785 L).

**5005.3 Outdoor dispensing and use.** Dispensing and use of hazardous materials outdoors shall be in accordance with Sections 5005.3.1 through 5005.3.9.

**[S] 5005.3.1 Quantities exceeding the maximum allowable quantity per control area.** Outdoor dispensing or use of hazardous materials, in either closed or open containers or systems, in amounts exceeding the *maximum allowable quantity per control area* indicated in Tables 5003.1.1(3) and 5003.1.1(4) shall be in accordance with Sections 5001, 5003, 5005.1 and 5005.3. Freight containers may be used as an alternative per Seattle Fire Department Administrative Rule 27.02, Storage and Use of Hazardous Materials, Including Flammable and Combustible Liquids, in Freight Containers Outside of Buildings.

**5005.3.2 Quantities not exceeding the maximum allowable quantity per control area.** Outdoor dispensing or use of hazardous materials, in either closed or open containers or systems, in amounts not exceeding the *maximum allowable quantity per control area* indicated in Tables 5003.1.1(3) and 5003.1.1(4) shall be in accordance with Sections 5001 and 5003.

**5005.3.3 Outdoor location.** Outdoor dispensing and use areas for hazardous materials shall be located as required by Section 5003.12 except where material-specific requirements, including requirements in referenced standards, are provided in other chapters of this code.

**5005.3.4 Spill control for hazardous material liquids in open systems.** Outdoor areas where hazardous material liquids are dispensed in vessels exceeding a 1.3-gallon (5 L) capacity or used in *open systems* exceeding a 5.3-gallon (20 L) capacity shall be provided with spill control in accordance with Section 5004.2.1.

**5005.3.5 Secondary containment for hazardous material liquids in open systems.** Where required by Table 5005.2.1.4, outdoor areas where hazardous material liquids are dispensed or used in *open systems* shall be provided with secondary containment in accordance with Section 5004.2.2 where the capacity of an individual vessel or system or the capacity of multiple vessels or systems exceeds the following:

1. Individual vessel or system: greater than 1.3 gallons (5 L).
2. Multiple vessels or systems: greater than 5.3 gallons (20 L).

**5005.3.6 Spill control for hazardous material liquids in closed systems.** Outdoor areas where hazardous material liquids are used in *closed systems* exceeding 55 gallons (208 L) shall be provided with spill control in accordance with Section 5004.2.1.

## COMPRESSED GASES

**5305.3 Piping systems.** Piping, including tubing, valves, fittings and pressure regulators, shall comply with this section and Chapter 50. Piping, tubing, pressure regulators, valves and other apparatus shall be kept gas tight to prevent leakage.

**5305.4 Valves.** Valves utilized on *compressed gas* systems shall be suitable for the use intended. Access to such valves shall be provided and maintained. Valve handles or operators for required shutoff valves shall not be removed or otherwise altered to prevent access.

**5305.5 Venting.** Venting of gases shall be directed to an *approved* location. Venting shall comply with the *International Mechanical Code*.

**5305.6 Upright use.** *Compressed gas* containers, cylinders and tanks, except those designed for use in a horizontal position, and all *compressed gas* containers, cylinders and tanks containing nonliquefied gases, shall be used in an upright position with the valve end up. An upright position shall include conditions where the container, cylinder or tank axis is inclined as much as 45 degrees (0.80 rad) from the vertical. Use of nonflammable liquefied gases in the inverted position where the liquid phase is used shall not be prohibited provided that the container, cylinder or tank is properly secured and the dispensing apparatus is designed for liquefied gas use.

**Exception:** *Compressed gas* containers, cylinders and tanks with a water volume less than 1.3 gallons (5 L) are allowed to be used in a horizontal position.

**5305.7 Transfer.** Transfer of gases between containers, cylinders and tanks shall be performed by qualified personnel using equipment and operating procedures in accordance with CGA P-1.

**Exception:** The fueling of vehicles with CNG or CH<sub>2</sub>, conducted in accordance with Chapter 23.

**5305.8 Use of compressed gas for inflation.** Inflatable equipment, devices or balloons shall only be pressurized or filled with compressed air or inert gases.

**5305.9 Material-specific regulations.** In addition to the requirements of this section, indoor and outdoor use of *compressed gases* shall comply with the material-specific provisions of Chapters 54, 58 and 60 through 67.

**5305.10 Handling.** The handling of *compressed gas* containers, cylinders and tanks shall comply with Sections 5305.10.1 and 5305.10.2.

**5305.10.1 Carts and trucks.** Containers, cylinders and tanks shall be moved using an *approved* method. Where containers, cylinders or tanks are moved by hand cart, hand truck or other mobile device, such carts, trucks or devices shall be designed for the secure movement of containers, cylinders or tanks. Carts and trucks utilized for transport of *compressed gas* containers, cylinders and tanks within buildings shall comply with Section 5003.10. Carts and trucks utilized for transport of *compressed gas* containers, cylinders and tanks exterior to buildings shall be designed so that the containers, cylinders and tanks will be secured against dropping or otherwise striking against each other or other surfaces.

**5305.10.2 Lifting devices.** Ropes, chains or slings shall not be used to suspend *compressed gas* containers, cylinders and tanks unless provisions at time of manufacture have been made on the container, cylinder or tank for appropriate lifting attachments, such as lugs.

## SECTION 5306 MEDICAL GASES

**[W] 5306.1 General.** ~~((Medical gases at health care related facilities intended for patient or veterinary care shall comply with Sections 5306.2 through 5306.5 in addition to other requirements of this chapter and Section 427 of the *International Building Code*))~~ Compressed gases at hospitals and similar facilities intended for inhalation or sedation including, but not limited to, analgesia systems for dentistry, podiatry, veterinary and similar uses shall comply with Sections 5306.2 through 5306.5 in addition to other requirements of this chapter.

**Exception:** All new distribution piping, supply manifolds, connections, regulators, valves, alarms, sensors and associated equipment shall be in accordance with the *Plumbing Code*.

**5306.1.1 Training.** Personnel who handle medical gases and associated equipment and cylinders shall be trained on the use, safe handling and associated hazards.

**[S] 5306.2 Interior supply location.** Medical gases shall be ~~((located))~~ stored in areas dedicated to the storage of such gases without other storage or uses. Where containers of medical gases in quantities greater than the permit amount are located inside buildings, they shall be in a 1-hour exterior room, a 1-hour interior room or a gas cabinet in accordance with Section 5306.2.1, 5306.2.2 or 5306.2.3, respectively. Rooms or areas where medical gases are stored or used in quantities exceeding the *maximum allowable quantity per control area* as set forth in Section 5003.1 shall ~~((be in accordance))~~ comply with the *International Building Code* for high-hazard Group H occupancies.

**[S] 5306.2.1 One-hour exterior rooms.** A 1-hour exterior room shall be a room or enclosure separated from the remainder of the building by *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal*

*assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both, with a *fire-resistance rating* of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be self-closing smoke- and draft-control assemblies having a *fire protection rating* of not less than 1 hour. Rooms shall have not less than one exterior wall that is provided with not less than two vents. Each vent shall have a minimum free opening area of ~~((36))~~ 24 square inches ~~((232))~~ 155 cm<sup>2</sup> for each 1,000 cubic feet (28 m<sup>3</sup>) at *normal temperature and pressure* (NTP) of gas stored in the room and shall be not less than 72 square inches (465 cm<sup>2</sup>) in aggregate free opening area. One vent shall be within 6 inches (152 mm) of the floor and one shall be within 6 inches (152 mm) of the ceiling. Rooms shall be provided with not less than one automatic sprinkler to provide container cooling in case of fire.

[S] **5306.2.2 One-hour interior room.** Where an exterior wall cannot be provided for the room, ~~((a 1-hour interior room shall be provided and shall be a room or enclosure separated from the remainder of the building by fire barriers constructed in accordance with Section 707 of the International Building Code or horizontal assemblies constructed in accordance with Section 711 of the International Building Code, or both, with a fire-resistance rating of not less than 1 hour. Openings))~~ openings between the room or enclosure and interior spaces shall be provided with self-closing ~~((, smoke and draft control assemblies having a fire protection rating of not less than 1 hour))~~ assemblies. ~~((An automatic))~~ *Automatic sprinklers* ~~((system))~~ shall be installed within the room. The room shall be exhausted through a duct to the exterior. Supply and exhaust ducts shall be enclosed in a 1-hour-rated ~~((shaft))~~ enclosure from the room to the exterior. *Approved* mechanical ventilation shall comply with the *International Mechanical Code* and be provided at a minimum rate of 1 cfm per square foot [0.00508 m<sup>3</sup>/(s × m<sup>2</sup>)] of the area of the room.

**Exception:** A 1-hour rated enclosure to the exterior is not required where the building is equipped with an *automatic sprinkler system* throughout.

**5306.2.3 Gas cabinets.** Gas cabinets shall be constructed in accordance with Section 5003.8.6 and shall comply with the following:

1. Exhausted to the exterior through dedicated exhaust duct system installed in accordance with Chapter 5 of the *International Mechanical Code*.
2. Supply and exhaust ducts shall be enclosed in a 1-hour *fire-resistance-rated* shaft enclosure from the cabinet to the exterior. The average velocity of ventilation at the face of access ports or windows shall be not less than 200 feet per minute (1.02 m/s) with not less than 150 feet per minute (0.76 m/s) at any point of the access port or window.
3. Provided with an *automatic sprinkler system* internal to the cabinet.

**5306.3 Exterior supply locations.** Oxidizer medical gas systems located on the exterior of a building with quantities greater than the permit amount shall be located in accordance with Section 6304.2.1.

**5306.4 Transfilling.** Transfilling areas and operations including, but not limited to, ventilation and separation, shall comply with NFPA 99.

[W] **5306.5 Medical gas systems, ~~((and equipment. Medical))~~** The maintenance and testing of medical gas systems ~~((and equipment))~~ including, but not limited to, distribution piping, supply manifolds, connections, pressure regulators and relief devices and valves shall ~~((be installed, tested and labeled in accordance with))~~ comply with the maintenance and testing requirements of NFPA 99 and the general provisions of this chapter. ~~((Existing medical gas systems and equipment shall be used and maintained in accordance with the use, maintenance, inspection and testing provisions of NFPA 99 for medical gas systems and equipment.))~~

## SECTION 5307 COMPRESSED GASES NOT OTHERWISE REGULATED

**5307.1 General.** *Compressed gases* in storage or use not regulated by the material-specific provisions of Chapters 6, 54, 55, and 60 through 67, including asphyxiant, irritant and radioactive gases, shall comply with this section in addition to other requirements of this chapter.

**5307.2 Ventilation.** Indoor storage and use areas and storage buildings shall be provided with ventilation in accordance with Section 5004.3. Where mechanical ventilation is provided, the systems shall be operational during such time as the building or space is occupied.

### Exceptions:

1. A gas detection system complying with Section 5307.2.1 shall be permitted in lieu of mechanical ventilation.
2. Areas containing insulated liquid carbon dioxide systems used in beverage dispensing applications shall comply with Section 5307.3.

**5307.2.1 Gas detection system.** In rooms or areas not provided with ventilation in accordance with Section 5307.2, a gas detection system complying with Section 916 or, where *approved*, an oxygen depletion alarm system, either of which initiates audible and visible alarm signals in the room or area where sensors are installed, shall be provided.



## CHAPTER 56

# EXPLOSIVES AND FIREWORKS

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**User note:**

**About this chapter:** Chapter 56 prescribes minimum requirements for the safe manufacture, storage, handling and use of explosives, ammunition and blasting agents for commercial and industrial occupancies. These provisions are intended to protect the general public, emergency responders and individuals who handle explosives. It also regulates the manufacturing, retail sale, display and wholesale distribution of fireworks; establishes the requirements for obtaining approval to manufacture, store, sell, discharge or conduct a public display; and references national standards for regulations governing manufacture, storage and public displays.

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### SECTION 5601 GENERAL

**[W][S] 5601.1 Scope.** The provisions of this chapter shall govern the possession, manufacture, storage, handling, sale and use of *explosives, explosive materials, ((fireworks))* and small arms ammunition. The manufacture, storage, handling, sale and use of fireworks shall be governed by Chapter 70.77 RCW, and by Chapter 212-17 WAC and local ordinances consistent with Chapter 212-17 WAC.

**Exceptions:**

1. The Armed Forces of the United States, Coast Guard or National Guard.
2. *Explosives* in forms prescribed by the official United States Pharmacopoeia.
3. The possession, storage and use of small arms ammunition where packaged in accordance with DOTn packaging requirements.
4. The possession, storage and use of not more than 1 pound (0.454 kg) of commercially manufactured sporting black powder, 20 pounds (9 kg) of smokeless powder and 10,000 small arms primers for hand loading of small arms ammunition for personal consumption.
5. The use of *explosive materials* by federal, state and local regulatory, law enforcement and fire agencies acting in their official capacities.
6. Special industrial *explosive* devices that in the aggregate contain less than 50 pounds (23 kg) of *explosive materials*.
7. The possession, storage and use of blank industrial-power load cartridges where packaged in accordance with DOTn packaging regulations.
8. Transportation in accordance with DOTn 49 CFR Parts 100–185.
9. Items preempted by federal regulations.
10. Explosive material, fireworks, pyrotechnic special effect material and small arms ammunition located at permitted marine terminals in accordance with Administrative Rule 27.01, *Marine Terminals*, and any future revisions of this rule adopted by the fire code official.

**[W] 5601.1.1 Explosive material standard.** In addition to the requirements of this chapter, NFPA 495 shall govern the manufacture, transportation, storage, sale, handling and use of *explosive materials*. See also Chapter 70.74 RCW and Chapter 296-52 WAC.

**5601.1.2 Explosive material terminals.** In addition to the requirements of this chapter, the operation of *explosive material* terminals shall conform to the provisions of NFPA 498.

**[S] 5601.1.3 Fireworks.** The possession, manufacture, storage, sale, handling and use of fireworks are prohibited.

**Exceptions:**

1. Storage and handling of fireworks as allowed in Section 5604.
- ~~2. Manufacture, assembly and testing of fireworks as allowed in Section 5605.~~
- 3) 2. The use of fireworks for fireworks displays as allowed in Section 5608.
- ~~4. The possession, storage, sale, handling and use of specific types of Division 1.4G fireworks where allowed by applicable laws, ordinances and regulations, provided that such fireworks and facilities comply with the 2006 edition of NFPA 1124, CPSC 16 CFR Parts 1500 and 1507, and DOTn 49 CFR Parts 100–185, as applicable for consumer fireworks.)~~

**5601.1.4 Rocketry.** The storage, handling and use of model and high-power rockets shall comply with the requirements of NFPA 1122, NFPA 1125 and NFPA 1127.

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**5601.1.5 Ammonium nitrate.** The storage and handling of ammonium nitrate shall comply with the requirements of NFPA 400 and Chapter 63.

**Exception:** Storage of ammonium nitrate in magazines with blasting agents shall comply with the requirements of NFPA 495.

**5601.2 Permit required.** Permits shall be required as set forth in Section 105.5 and regulated in accordance with this section.

**5601.2.1 Residential uses.** Persons shall not keep or store, nor shall any permit be issued to keep or store, any *explosives* at any place of habitation, or within 100 feet (30 480 mm) thereof.

**Exception:** Storage of smokeless propellant, black powder and small arms primers for personal use and not for resale in accordance with Section 5606.

**5601.2.2 Sale and retail display.** Persons shall not construct a retail display nor offer for sale *explosives, explosive materials* or fireworks on highways, sidewalks, public property or in Group A or E occupancies.

**5601.2.3 Permit restrictions.** The *fire code official* is authorized to limit the quantity of *explosives, explosive materials* or fireworks permitted at a given location. Persons possessing a permit for storage of *explosives* at any place, shall not keep or store an amount greater than authorized in such permit. Only the kind of *explosive* specified in such a permit shall be kept or stored.

**[S] 5601.2.4 Financial responsibility.** Before a permit is issued, as required by Section 5601.2, ~~((the applicant shall file with the jurisdiction a corporate surety bond in the principal sum of \$100,000 or a public liability insurance policy for the same amount, for the purpose of the payment of all damages to persons or property that arise from, or are caused by, the conduct of any act authorized by the permit upon which any judicial judgment results))~~ liability insurance in accordance with Section 105.3.9 of this code shall be obtained. ~~((The *fire code official* is authorized to specify a greater or lesser amount when, in his or her opinion, conditions at the location of use indicate a greater or lesser amount is required. Government entities shall be exempt from this bond requirement.))~~

**5601.2.4.1 Blasting.** Before approval to do blasting is issued, the applicant for approval shall file a bond or submit a certificate of insurance in such form, amount and coverage as determined by the legal department of the jurisdiction to be adequate in each case to indemnify the jurisdiction against any and all damages arising from permitted blasting.

~~**[S] ((5601.2.4.2 Fireworks display.** The permit holder shall furnish a bond or certificate of insurance in an amount deemed adequate by the *fire code official* for the payment of all potential damages to a person or persons or to property by reason of the permitted display, and arising from any acts of the permit holder, the agent, employees or subcontractors.))~~

**5601.3 Prohibited explosives.** Permits shall not be issued or renewed for possession, manufacture, storage, handling, sale or use of the following materials and such materials currently in storage or use shall be disposed of in an *approved* manner.

1. Liquid nitroglycerin.
2. Dynamite containing more than 60-percent liquid *explosive* ingredient.
3. Dynamite having an unsatisfactory absorbent or one that permits leakage of a liquid *explosive* ingredient under any conditions liable to exist during storage.
4. Nitrocellulose in a dry and uncompressed condition in a quantity greater than 10 pounds (4.54 kg) of net weight in one package.
5. Fulminate of mercury in a dry condition and fulminate of all other metals in any condition except as a component of manufactured articles not hereinafter forbidden.
6. *Explosive* compositions that ignite spontaneously or undergo marked decomposition, rendering the products of their use more hazardous, when subjected for 48 consecutive hours or less to a temperature of 167°F (75°C).
7. New *explosive materials* until *approved* by DOTn, except that permits are allowed to be issued to educational, governmental or industrial laboratories for instructional or research purposes.
8. *Explosive materials* forbidden for transport by DOTn.
9. *Explosive materials* containing an ammonium salt and a chlorate.
10. *Explosives* not packed or marked as required by DOTn 49 CFR Parts 100–185.

**Exception:** Gelatin dynamite.

**5601.4 Qualifications.** Persons in charge of magazines, blasting, fireworks display or pyrotechnic special effect operations shall not be under the influence of alcohol or drugs that impair sensory or motor skills, shall be not less than 21 years of age and shall demonstrate knowledge of all safety precautions related to the storage, handling or use of *explosives, explosive materials* or fireworks.

**5601.5 Supervision.** The *fire code official* is authorized to require operations permitted under the provisions of Section 5601.2 to be supervised at any time by the *fire code official* in order to determine compliance with all safety and fire regulations.

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**5604.7.8 Compatibility.** Corresponding grades and brands of *explosive materials* shall be stored together and in such a manner that the grade and brand marks are visible. Stocks shall be stored so as to be easily counted and checked. Packages of *explosive materials* shall be stacked in a stable manner not exceeding 8 feet (2438 mm) in height.

**5604.7.9 Stock rotation.** When *explosive material* is removed from a magazine for use, the oldest usable stocks shall be removed first.

**5604.8 Maintenance.** Maintenance of magazines shall comply with Sections 5604.8.1 through 5604.8.3.

**5604.8.1 Housekeeping.** Magazine floors shall be regularly swept and be kept clean, dry and free of grit, paper, empty packages and rubbish. Brooms and other cleaning utensils shall not have any spark-producing metal parts. Sweepings from magazine floors shall be disposed of in accordance with the manufacturer's *approved* instructions.

**5604.8.2 Repairs.** *Explosive materials* shall be removed from the magazine before making repairs to the interior of a magazine. *Explosive materials* shall be removed from the magazine before making repairs to the exterior of the magazine where there is a possibility of causing a fire. *Explosive materials* removed from a magazine under repair shall either be placed in another magazine or placed a safe distance from the magazine, where they shall be properly guarded and protected until repairs have been completed. Upon completion of repairs, the *explosive materials* shall be promptly returned to the magazine. Floors shall be cleaned before and after repairs.

**5604.8.3 Floors.** Magazine floors stained with liquid shall be dealt with in accordance with instructions obtained from the manufacturer of the *explosive material* stored in the magazine.

**5604.9 Inspection.** Magazines containing *explosive materials* shall be opened and inspected at maximum seven-day intervals. The inspection shall determine whether there has been an unauthorized or attempted entry into a magazine or an unauthorized removal of a magazine or its contents.

**5604.10 Disposal of explosive materials.** *Explosive materials* shall be disposed of in accordance with Sections 5604.10.1 through 5604.10.7.

**5604.10.1 Notification.** The *fire code official* shall be notified immediately where deteriorated or leaking *explosive materials* are determined to be dangerous or unstable and in need of disposal.

**5604.10.2 Deteriorated materials.** Where an *explosive material* has deteriorated to an extent that it is in an unstable or dangerous condition, or when a liquid has leaked from an *explosive material*, the person in possession of such material shall immediately contact the material's manufacturer to obtain disposal and handling instructions.

**5604.10.3 Qualified person.** The work of destroying explosive materials shall be directed by persons experienced in the destruction of *explosive materials*.

**5604.10.4 Storage of misfires.** *Explosive materials* and fireworks recovered from blasting or display misfires shall be placed in a magazine until an experienced person has determined the proper method for disposal.

**5604.10.5 Disposal sites.** Sites for the destruction of *explosive materials* and fireworks shall be *approved* and located at the maximum practicable safe distance from inhabited buildings, public highways, operating buildings and all other exposures to ensure keeping air blast and ground vibration to a minimum. The location of disposal sites shall not be closer to magazines, inhabited buildings, railways, highways and other rights-of-way than is allowed by Tables 5604.5.2(1), 5604.5.2(2) and 5604.5.2(3). Where possible, *barricades* shall be utilized between the destruction site and inhabited buildings. Areas where *explosives* are detonated or burned shall be posted with adequate warning signs.

**5604.10.6 Reuse of site.** Unless an *approved* burning site has been thoroughly saturated with water and has passed a safety inspection, 48 hours shall elapse between the completion of a burn and the placement of scrap *explosive materials* for a subsequent burn.

**5604.10.7 Personnel safeguards.** Once an *explosive* burn operation has been started, personnel shall relocate to a safe location where adequate protection from air blast and flying debris is provided. Personnel shall not return to the burn area until the person in charge has inspected the burn site and determined that it is safe for personnel to return.

### SECTION 5605 MANUFACTURE, ASSEMBLY AND TESTING OF EXPLOSIVES, EXPLOSIVE MATERIALS AND FIREWORKS

[S] **5605.1 General.** The manufacture, assembly and testing of *explosives*, ammunition, blasting agents and fireworks (~~shall comply with the requirements of this section and NFPA 495 or NFPA 1124~~) is prohibited.

#### Exceptions:

1. The hand loading of small arms ammunition prepared for personal use and not offered for resale.
2. The mixing and loading of blasting agents at blasting sites in accordance with NFPA 495.

3. The use of binary *explosives* or phosphoric materials in blasting or pyrotechnic special effects applications in accordance with NFPA 495 or NFPA 1126.

~~[S] ((5605.2 Emergency planning and preparedness. Emergency plans, emergency drills, employee training and hazard communication shall conform to the provisions of this section and Sections 404, 405, 406 and 407.~~

~~5605.2.1 Hazardous Materials Management Plans and Inventory Statements required. Detailed Hazardous Materials Management Plans (HMMP) and Hazardous Materials Inventory Statements (HMIS) complying with the requirements of Section 407 shall be prepared and submitted to the local emergency planning committee, the fire code official and the local fire department.~~

~~5605.2.2 Maintenance of plans. A copy of the required HMMP and HMIS shall be maintained on site and furnished to the fire code official on request.~~

~~5605.2.3 Employee training. Workers who handle explosives or explosive charges or dispose of explosives shall be trained in the hazards of the materials and processes in which they are to be engaged and with the safety rules governing such materials and processes.~~

~~5605.2.4 Emergency procedures. Approved emergency procedures shall be formulated for each plant and shall include personal instruction in any anticipated emergency. Personnel shall be made aware of an emergency warning signal.)~~

~~[S] ((5605.3 Intraplant separation of operating buildings. Explosives manufacturing buildings and fireworks manufacturing buildings, including those where explosive charges are assembled, manufactured, prepared or loaded utilizing Division 1.1, 1.2, 1.3, 1.4 or 1.5 explosives, shall be separated from all other buildings, including magazines, within the confines of the manufacturing plant, at a distance not less than those shown in Table 5604.5.2(3) or Table 5605.3, as appropriate.~~

~~The quantity of explosives in an operating building shall be the net weight of all explosives contained therein. Distances shall be based on the hazard division requiring the greatest separation, unless the aggregate explosive weight is divided by approved walls or shields designed for that purpose. Where dividing a quantity of explosives into smaller stacks, a suitable barrier or adequate separation distance shall be provided to prevent propagation from one stack to another.~~

~~Where distance is used as the sole means of separation within a building, such distance shall be established by testing. Testing shall demonstrate that propagation between stacks will not result. Barriers provided to protect against explosive effects shall be designed and installed in accordance with approved standards.~~

~~Exception: Fireworks manufacturing buildings separated in accordance with NFPA 1124.)~~

TABLE 5605.3  
MINIMUM INTRALINE (INTRAPLANT) SEPARATION DISTANCES (ILD OR IPD)  
BETWEEN BARRICADED OPERATING BUILDINGS CONTAINING EXPLOSIVES—  
DIVISION 1.1, 1.2 OR 1.5 MASS-EXPLOSION HAZARD<sup>a</sup>

NET EXPLOSIVE WEIGHT		
Pounds Over	Pounds Not Over	Intraline Distance (ILD) or Intraplant Distance (IPD) (feet)
0	50	30
50	100	40
100	200	50
200	300	60
300	400	65
400	500	70
500	600	75
600	700	80
700	800	85
800	900	90
900	1,000	95
1,000	1,500	105
1,500	2,000	115
2,000	3,000	130
3,000	4,000	140
4,000	5,000	150
5,000	6,000	160
6,000	7,000	170
7,000	8,000	180

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**TABLE 5605.3—continued  
MINIMUM INTRALINE (INTRAPLANT) SEPARATION DISTANCES (ILD OR IPD)  
BETWEEN BARRICADED OPERATING BUILDINGS CONTAINING EXPLOSIVES—  
DIVISION 1.1, 1.2 OR 1.5 MASS-EXPLOSION HAZARD<sup>a</sup>**

NET EXPLOSIVE WEIGHT		
Pounds Over	Pounds Not Over	Intraline Distance (ILD) or Intraplant Distance (IPD) (feet)
8,000	9,000	190
9,000	10,000	200
10,000	15,000	225
15,000	20,000	245
20,000	25,000	265
25,000	30,000	280
30,000	35,000	295
35,000	40,000	310
40,000	45,000	320
45,000	50,000	330
50,000	55,000	340
55,000	60,000	350
60,000	65,000	360
65,000	70,000	370
70,000	75,000	385
75,000	80,000	390
80,000	85,000	395
85,000	90,000	400
90,000	95,000	410
95,000	100,000	415
100,000	125,000	450
125,000	150,000	475
150,000	175,000	500
175,000	200,000	525
200,000	225,000	550
225,000	250,000	575
250,000	275,000	600
275,000	300,000	635

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

a. Where a building or magazine containing explosives is not barricaded, the intraline distances shown in this table shall be doubled.

**[S] ((5605.4 Separation of manufacturing operating buildings from inhabited buildings, public traffic routes and magazines.** Where an operating building on an *explosive materials* plant site is designed to contain *explosive materials*, such a building shall be located away from inhabited buildings, public traffic routes and magazines in accordance with Table 5604.5.2(2) or 5604.5.2(3) as appropriate, based on the maximum quantity of *explosive materials* permitted to be in the building at one time (see Section 5601.8).

**Exception:** Fireworks manufacturing buildings constructed and operated in accordance with NFPA 1124.

**5605.4.1 Determination of net explosive weight for operating buildings.** In addition to the requirements of Section 5601.8 to determine the net *explosive* weight for materials stored or used in operating buildings, quantities of *explosive materials* stored in magazines located at distances less than intraline distances from the operating building shall be added to the contents of the operating building to determine the net *explosive* weight for the operating building.

**5605.4.1.1 Indoor magazines.** The storage of *explosive materials* located in indoor magazines in operating buildings shall be limited to a net *explosive* weight not to exceed 50 pounds (23 kg).

**5605.4.1.2 Outdoor magazines with a net explosive weight less than 50 pounds.** The storage of *explosive materials* in outdoor magazines located at less than intraline distances from operating buildings shall be limited to a net *explosive* weight not to exceed 50 pounds (23 kg).

~~**5605.4.1.3 Outdoor magazines with a net explosive weight greater than 50 pounds.** The storage of *explosive materials* in outdoor magazines in quantities exceeding 50 pounds (23 kg) net *explosive* weight shall be limited to storage in outdoor magazines located not less than intraline distances from the operating building in accordance with Section 5604.5.2.~~

~~**5605.4.1.4 Net explosive weight of materials stored in combination indoor and outdoor magazines.** The aggregate quantity of *explosive materials* stored in any combination of indoor magazines or outdoor magazines located at less than the intraline distances from an operating building shall not exceed 50 pounds (23 kg.)~~

[S] (~~**5605.5 Buildings and equipment.** Buildings or rooms that exceed the *maximum allowable quantity per control area* of *explosive materials* shall be operated in accordance with this section and constructed in accordance with the requirements of the *International Building Code* for Group II occupancies.~~

~~**Exception:** Fireworks manufacturing buildings constructed and operated in accordance with NFPA 1124.~~

~~**5605.5.1 Explosives dust.** *Explosives* dust shall not be exhausted to the atmosphere.~~

~~**5605.5.1.1 Wet collector.** When collecting *explosives* dust, a wet collector system shall be used. Wetting agents shall be compatible with the *explosives*. Collector systems shall be interlocked with process power supplies so that the process cannot continue without the collector systems operating.~~

~~**5605.5.1.2 Waste disposal and maintenance.** *Explosives* dust shall be removed from the collection chamber as often as necessary to prevent overloading. The entire system shall be cleaned at a frequency that will eliminate hazardous concentrations of *explosives* dust in pipes, tubing and ducts.~~

~~**5605.5.2 Exhaust fans.** Squirrel cage blowers shall not be used for exhausting hazardous fumes, vapors or gases. Only nonferrous fan blades shall be used for fans located within the ductwork and through which hazardous materials are exhausted. Motors shall be located outside the duct.~~

~~**5605.5.3 Work stations.** Work stations shall be separated by distance, barrier or other *approved* alternatives so that fire in one station will not ignite material in another work station. Where necessary, the operator shall be protected by a personnel shield located between the operator and the *explosive* device or *explosive material* being processed. This shield and its support shall be capable of withstanding a blast from the maximum amount of *explosives* allowed behind it.)~~

[S] (~~**5605.6 Operations.** Operations involving *explosives* shall comply with Sections 5605.6.1 through 5605.6.10.~~

~~**5605.6.1 Isolation of operations.** Where the type of material and processing warrants, mechanical operations involving *explosives* in excess of 1 pound (0.454 kg) shall be carried on at isolated stations or at intraplant distances, and machinery shall be controlled from remote locations behind *barricades* or at separations so that workers will be at a safe distance while machinery is operating.~~

~~**5605.6.2 Static controls.** The work area where the screening, grinding, blending and other processing of static-sensitive *explosives* or pyrotechnic materials is done shall be provided with *approved* static controls.~~

~~**5605.6.3 Approved containers.** Bulk *explosives* shall be kept in *approved*, nonsparking containers when not being used or processed. *Explosives* shall not be stored or transported in open containers.~~

~~**5605.6.4 Quantity limits.** The quantity of *explosives* at any particular work station shall be limited to that posted on the load limit signs for the individual work station. The total quantity of *explosives* for multiple work stations shall not exceed that established by the intraplant distances in Table 5604.5.2(3) or Table 5605.3, as appropriate.~~

~~**5605.6.4.1 Magazines.** Magazines used for storage in processing areas shall be in accordance with the requirements of Section 5604.5.1. *Explosive materials* shall be removed to appropriate storage magazines for unattended storage at the end of the workday. The contents of indoor magazines shall be added to the quantity of *explosives* contained at individual work stations and the total quantity of material stored, processed or used shall be utilized to establish the intraplant separation distances indicated by Table 5604.5.2(3) or Table 5605.3, as appropriate.~~

~~**5605.6.5 Waste disposal.** *Approved* receptacles with covers shall be provided for each location for disposing of waste material and debris. These waste receptacles shall be emptied and cleaned as often as necessary but not less than once each day or at the end of each shift.~~

~~**5605.6.6 Safety rules.** General safety rules and operating instructions governing the particular operation or process conducted at that location shall be available at each location.~~

~~**5605.6.7 Personnel limits.** The number of occupants in each process building and in each magazine shall not exceed the number necessary for proper conduct of production operations.~~

~~**5605.6.8 Pyrotechnic and explosive composition quantity limits.** Not more than 500 pounds (227 kg) of pyrotechnic or *explosive* composition, including not more than 10 pounds (5 kg) of salute powder shall be allowed at one time in any process building or area. Compositions not in current use shall be kept in covered nonferrous containers.~~

~~**Exception:** Composition that has been loaded or pressed into tubes or other containers as consumer fireworks.~~

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**5605.6.9 Posting limits.** The maximum number of occupants and maximum weight of pyrotechnic and *explosive* composition permitted in each process building shall be posted in a conspicuous location in each process building or magazine.

**5605.6.10 Heat sources.** Fireworks, *explosives* or *explosive* charges in *explosive materials* manufacturing, assembly or testing shall not be stored near any source of heat.

**Exception:** *Approved drying or curing operations.*)

[S] ((**5605.7 Maintenance.** Maintenance and repair of *explosives* manufacturing facilities and areas shall comply with Section 5604.8.))

[S] ((**5605.8 Explosive materials testing sites.** *Detonation of explosive materials* or ignition of fireworks for testing purposes shall be done only in isolated areas at sites where distance, protection from missiles, shrapnel or flyrock, and other safeguards provides protection against injury to personnel or damage to property.

**5605.8.1 Protective clothing and equipment.** Protective clothing and equipment shall be provided to protect persons engaged in the testing, ignition or *detonation of explosive materials*.

**5605.8.2 Site security.** Where tests are being conducted or *explosives* are being detonated, only authorized persons shall be present. Areas where *explosives* are regularly or frequently detonated or burned shall be *approved* and posted with adequate warning signs. Warning devices shall be activated before burning or detonating *explosives* to alert persons approaching from any direction that they are approaching a danger zone.))

[S] ((**5605.9 Waste disposal.** Disposal of *explosive materials* waste from manufacturing, assembly or testing operations shall be in accordance with Section 5604.10.))

## SECTION 5606 SMALL ARMS AMMUNITION AND SMALL ARMS AMMUNITION COMPONENTS

**5606.1 General.** Indoor storage and display of black powder, smokeless propellants, small arms primers, small arms ammunition and commercial reloading shall comply with this section and NFPA 495.

**5606.2 Prohibited storage.** Small arms ammunition shall not be stored together with Division 1.1, Division 1.2 or Division 1.3 *explosives* unless the storage facility is suitable for the storage of *explosive materials*.

**5606.3 Packages.** Smokeless propellants shall be stored in *approved* shipping containers conforming to DOTn 49 CFR Part 173.

**5606.3.1 Repackaging.** The bulk repackaging of smokeless propellants, black powder and small arms primers shall not be performed in retail establishments.

**5606.3.2 Damaged packages.** Damaged containers shall not be repackaged.

**Exception:** *Approved* repackaging of damaged containers of smokeless propellant into containers of the same type and size as the original container.

**5606.4 Storage in Group R occupancies.** The storage of small arms ammunition components in Group R occupancies shall comply with Sections 5606.4.1 through 5606.4.3.

**5606.4.1 Black powder.** Black powder for personal use in quantities not exceeding 20 pounds (9 kg) shall be stored in original containers in occupancies limited to Group R-3. Quantities exceeding 20 pounds (9 kg) shall not be stored in any Group R occupancy.

**5606.4.2 Smokeless propellants.** Smokeless propellants for personal use in quantities not exceeding 20 pounds (9 kg) shall be stored in original containers in occupancies limited to Group R-3. Smokeless propellants in quantities exceeding 20 pounds (9 kg) but not exceeding 50 pounds (23 kg) and kept in a wooden box or cabinet having walls of not less than 1 inch (25 mm) nominal thickness shall be allowed to be stored in occupancies limited to Group R-3. Quantities exceeding these amounts shall not be stored in any Group R occupancy.

**5606.4.3 Small arms primers.** Not more than 10,000 small arms primers shall be stored in occupancies limited to Group R-3.

**5606.5 Display and storage in Group M occupancies.** The display and storage of small arms ammunition components in Group M occupancies shall comply with Sections 5606.5.1 through 5606.5.2.3.

**5606.5.1 Display.** Display of small arms ammunition components in Group M occupancies shall comply with Sections 5606.5.1.1 through 5606.5.1.3.

**5606.5.1.1 Smokeless propellant.** Not more than 20 pounds (9 kg) of smokeless propellants, in containers of 1 pound (0.454 kg) or less capacity each, shall be displayed in Group M occupancies.

**5606.5.1.2 Black powder.** Not more than 1 pound (0.454 kg) of black powder shall be displayed in Group M occupancies.

**5607.12 Connections.** The blaster shall supervise the connecting of the blastholes and the connection of the loadline to the power source or initiation point. Connections shall be made progressively from the blasthole back to the initiation point.

Blasting lead lines shall remain shunted (shorted) and shall not be connected to the blasting machine or other source of current until the blast is to be fired.

**5607.13 Firing control.** A blast shall not be fired until the blaster has made certain that all surplus *explosive materials* are in a safe place in accordance with Section 5607.10, all persons and equipment are at a safe distance or under sufficient cover and that an adequate warning signal has been given.

**5607.14 Post-blast procedures.** After the blast, the following procedures shall be observed.

1. Persons shall not return to the blast area until allowed to do so by the blaster in charge.
2. The blaster shall allow sufficient time for smoke and fumes to dissipate and for dust to settle before returning to or approaching the blast area.
3. The blaster shall inspect the entire blast site for misfires before allowing other personnel to return to the blast area.

**5607.15 Misfires.** Where a misfire is suspected, all initiating circuits shall be traced and a search made for unexploded charges. Where a misfire is found, the blaster shall provide proper safeguards for excluding all personnel from the blast area. Misfires shall be reported to the blasting supervisor immediately. Misfires shall be handled under the direction of the person in charge of the blasting operation in accordance with NFPA 495.

## SECTION 5608 FIREWORKS DISPLAY

~~[S] 5608.1 General. ((Outdoor fireworks displays, use of pyrotechnics before a proximate audience and pyrotechnic special effects in motion picture, television, theatrical and group entertainment productions shall comply with Sections 5608.2 through 5608.10 and NFPA 1123 or NFPA 1126.)) The sale, possession, use or discharge of fireworks and pyrotechnic special effects in Seattle is prohibited except where authorized by a fire department permit or exempted under this section.~~

### Exceptions:

1. The use of fireworks by railroads or other transportation agencies for signaling or illumination.
2. The sale or use of blank cartridges or fireworks if approved by the fire code official for theatrics, signaling or ceremonial purposes.
3. The use of fireworks by the United States Armed Forces.

~~[S] 5608.2 Permit application. Prior to issuing permits for a fireworks display, plans for the fireworks display, inspections of the display site and demonstrations of the display operations shall be approved. A plan establishing procedures to follow and actions to be taken in the event that a shell fails to ignite in, or discharge from, a mortar or fails to function over the fallout area or other malfunctions shall be provided to the fire code official.~~

~~An application for a permit shall be made in writing to the fire code official at least 30 days in advance of the display. At the time the permit application is submitted, the fire code official shall be consulted regarding requirements for standby fire apparatus. No person under 18 years of age may apply for or receive a permit under this section.~~

**5608.2.1 Outdoor fireworks displays.** In addition to the requirements of Section 403, permit applications for outdoor fireworks displays using Division 1.3G fireworks shall include a diagram of the location at which the fireworks display will be conducted, including the site from which fireworks will be discharged; the location of buildings, highways, overhead obstructions and utilities; and the lines behind which the audience will be restrained.

**5608.2.2 Use of pyrotechnics before a proximate audience.** Where the separation distances required in Section 5608.4 and NFPA 1123 are unavailable or cannot be secured, fireworks displays shall be conducted in accordance with NFPA 1126 for *proximate audiences*. Applications for use of pyrotechnics before a *proximate audience* shall include plans indicating the required clearances for spectators and combustibles, crowd control measures, smoke control measures and requirements for standby personnel and equipment where provision of such personnel or equipment is required by the *fire code official*.

**5608.3 Approved fireworks displays.** *Approved* fireworks displays shall include only the *approved* fireworks 1.3G, fireworks 1.4G, fireworks 1.4S and pyrotechnic articles 1.4G, which shall be handled by an *approved*, competent operator. The *approved* fireworks shall be arranged, located, discharged and fired in a manner that will not pose a hazard to property or endanger any person.

**5608.4 Clearance.** Spectators, spectator parking areas, and *dwellings*, buildings or structures shall not be located within the display site.



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### Exceptions:

1. This provision shall not apply to pyrotechnic special effects and fireworks displays using Division 1.4G materials before a *proximate audience* in accordance with NFPA 1126.
2. This provision shall not apply to unoccupied *dwelling*s, buildings and structures with the approval of the building owner and the *fire code official*.

**[S] 5608.4.1 Display site.** The radius of the display site for outdoor water or land displays shall be at least 100 foot per inch (1200 per mm) based on the internal mortar diameter of the largest aerial shell to be fired. The designated landing area shall be an approved large, clear, open area. Spectators, vehicles and combustible materials shall not be allowed within the designated landing area. The designated landing area shall not be within 100 feet (30 480 mm) of tents and membrane structures. The firing and storage site shall be located not less than 200 feet (60 960 mm) from a building, tent or membrane structure. When the display is fired from a barge, such barge shall be of noncombustible construction or have a noncombustible surface.

When the display is fired from a barge or vessel, a security area shall be established around the barge to prevent boats from entering the area. No boats shall be allowed within 200 feet (60 960 mm) of the firing or storage site. A boat shall be on standby to remove personnel from the barge or water in an emergency. All personnel aboard the barge shall have approved flotation devices. Additional water-filled fire extinguishers, rated 2-A minimum, shall be on the barge and so spaced that an extinguisher shall be available within 30 feet (9144 mm) at all times.

**5608.5 Storage of fireworks at display site.** The storage of fireworks at the display site shall comply with the requirements of this section and NFPA 1123 or NFPA 1126.

**5608.5.1 Supervision and weather protection.** Beginning as soon as fireworks have been delivered to the display site, they shall not be left unattended.

**5608.5.2 Weather protection.** Fireworks shall be kept dry after delivery to the display site.

**5608.5.3 Inspection.** Shells shall be inspected by the operator or assistants after delivery to the display site. Shells having tears, leaks, broken fuses or signs of having been wet shall be set aside and shall not be fired. Aerial shells shall be checked for proper fit in mortars prior to discharge. Aerial shells that do not fit properly shall not be fired. After the fireworks display, damaged, deteriorated or dud shells shall either be returned to the supplier or destroyed in accordance with the supplier's instructions and Section 5604.10.

**Exception:** Minor repairs to fuses shall be allowed. For electrically ignited displays, attachment of electric matches and similar tasks shall be allowed.

**5608.5.4 Sorting and separation.** After delivery to the display site and prior to the fireworks display, all shells shall be separated according to their size and their designation as salutes.

**Exception:** For electrically fired displays, or displays where all shells are loaded into mortars prior to the show, separation of shells according to their size or their designation as salutes is not required.

**5608.5.5 Ready boxes.** Display fireworks, 1.3G, that will be temporarily stored at the site during the fireworks display shall be stored in ready boxes located upwind and not less than 25 feet (7620 mm) from the mortar placement and separated according to their size and their designation as salutes.

**Exception:** For electrically fired fireworks displays, or fireworks displays where all shells are loaded into mortars prior to the show, separation of shells according to their size, their designation as salutes or for the use of ready boxes is not required.

**5608.6 Installation of mortars.** Mortars for firing fireworks shells shall be installed in accordance with NFPA 1123 and shall be positioned so that shells are propelled away from spectators and over the fallout area. Mortars shall not be angled toward the spectator viewing area. Prior to placement, mortars shall be inspected for defects, such as dents, bent ends, damaged interiors and damaged plugs. Defective mortars shall not be used.

**5608.7 Handling.** Aerial shells shall be carried to mortars by the shell body. For the purpose of loading mortars, aerial shells shall be held by the thick portion of the fuse and carefully loaded into mortars.

**5608.8 Fireworks display supervision.** Whenever in the opinion of the *fire code official* or the operator a hazardous condition exists, the fireworks display shall be discontinued immediately until such time as the dangerous situation is corrected.

**5608.9 Post-fireworks display inspection.** After the fireworks display, the firing crew shall conduct an inspection of the fallout area for the purpose of locating unexploded aerial shells or live components. This inspection shall be conducted before public access to the site shall be allowed. Where fireworks are displayed at night and it is not possible to inspect the site thoroughly, the operator or designated assistant shall inspect the entire site at first light.

A report identifying any shells that fail to ignite in, or discharge from, a mortar or fail to function over the fallout area or otherwise malfunction, shall be filed with the *fire code official*.

## CHAPTER 57

# FLAMMABLE AND COMBUSTIBLE LIQUIDS

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### User note:

**About this chapter:** Chapter 57 provides requirements that are intended to reduce the likelihood of fires involving the storage, handling, use or transportation of flammable and combustible liquids. Adherence to these practices may also limit damage in the event of an accidental fire involving these materials. These liquids are used for fuel, lubricants, cleaners, solvents, medicine and even drinking. The danger associated with flammable and combustible liquids is that the vapors from these liquids, when combined with air in their flammable range, will burn or explode at temperatures near normal living and working environments. The regulations herein are intended to prevent the flammable and combustible liquids from being ignited and provide mitigating requirements for when a fire does occur.

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### SECTION 5701 GENERAL

**5701.1 Scope and application.** Prevention, control and mitigation of dangerous conditions related to storage, use, dispensing, mixing and handling of *flammable* and *combustible liquids* shall be in accordance with Chapter 50 and this chapter.

**5701.2 Nonapplicability.** This chapter shall not apply to liquids as otherwise provided in other laws or regulations or chapters of this code, including:

1. Specific provisions for *flammable liquids* in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.
2. Medicines, foodstuffs, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solution not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Quantities of alcoholic beverages in retail or wholesale sales or storage occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
4. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 605. For abandonment of fuel oil tanks, this chapter applies.
5. Refrigeration systems (see Section 608).
6. Storage and display of aerosol products complying with Chapter 51.
7. Storage and use of liquids that do not have a fire point when tested in accordance with ASTM D92.
8. Liquids with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion.
9. Liquids without *flash points* that can be flammable under some conditions, such as certain halogenated hydrocarbons and mixtures containing halogenated hydrocarbons.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.
12. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.
13. The off-site transportation of *flammable* or *combustible liquids* where in accordance with Department of Transportation (DOTn) regulation.

**5701.3 Referenced documents.** The applicable requirements of Chapter 50, other chapters of this code, the *International Building Code* and the *International Mechanical Code* pertaining to *flammable liquids* shall apply.

**[S] 5701.4 Permits.** Permits (~~shall be~~) are required as set forth in Sections 105.5 and 105.6, unless a permit has been issued by the Department of Ecology to install an underground tank.

**5701.5 Material classification.** *Flammable* and *combustible liquids* shall be classified in accordance with the definitions in Chapter 2.

When mixed with lower flash-point liquids, Class II or III liquids are capable of assuming the characteristics of the lower flash-point liquids. Under such conditions, the appropriate provisions of this chapter for the actual *flash point* of the mixed liquid shall apply.

## FLAMMABLE AND COMBUSTIBLE LIQUIDS

Vent outlets shall be located such that flammable vapors will not be trapped by eaves or other obstructions and shall be not less than 5 feet (1524 mm) from building openings or *lot lines* of properties that can be built on. Vent outlets on atmospheric tanks storing Class IIIB liquids are allowed to discharge inside a building where the vent is a normally closed vent.

**Exception:** Vent pipe outlets on tanks storing Class IIIB liquid inside buildings and connected to fuel-burning equipment shall be located such that the vapors are released to a safe location outside of buildings.

**5704.2.7.3.4 Installation of vent piping.** Vent piping shall be designed, sized, constructed and installed in accordance with Section 5703.6. Vent pipes shall be installed such that they will drain toward the tank without sags or traps in which liquid can collect. Vent pipes shall be installed in such a manner so as not to be subject to physical damage or vibration.

**5704.2.7.3.5 Manifolding.** Tank vent piping shall not be manifolded unless required for special purposes such as vapor recovery, vapor conservation or air pollution control.

**5704.2.7.3.5.1 Above-ground tanks.** For above-ground tanks, manifolded vent pipes shall be adequately sized to prevent system pressure limits from being exceeded where manifolded tanks are subject to the same fire exposure.

**5704.2.7.3.5.2 Underground tanks.** For underground tanks, manifolded vent pipes shall be sized to prevent system pressure limits from being exceeded when manifolded tanks are filled simultaneously.

**5704.2.7.3.5.3 Tanks storing Class I liquids.** Vent piping for tanks storing Class I liquids shall not be manifolded with vent piping for tanks storing Class II and III liquids unless positive means are provided to prevent the vapors from Class I liquids from entering tanks storing Class II and III liquids, to prevent contamination and possible change in classification of less volatile liquid.

[S] **5704.2.7.4 Emergency venting.** Stationary, above-ground tanks shall be equipped with additional venting that will relieve excessive internal pressure caused by exposure to fires. Emergency vents for Class I, II and IIIA liquids shall ~~((not discharge inside buildings))~~ terminate outside buildings in accordance with Section 5704.2.7.3.3. The venting shall be installed and maintained in accordance with Section 22.7 of NFPA 30.

### Exceptions:

1. Tanks larger than 12,000 gallons (45 420 L) in capacity storing Class IIIB liquids that are not within the diked area or the drainage path of Class I or II liquids do not require emergency relief venting.
2. Emergency vents on protected above-ground tanks complying with UL 2085 containing Class II or IIIA liquids are allowed to discharge inside the building.

**5704.2.7.5 Tank openings other than vents.** Tank openings for other than vents shall comply with Sections 5704.2.7.5.1 through 5704.2.7.5.8.

**5704.2.7.5.1 Connections below liquid level.** Connections for tank openings below the liquid level shall be liquid tight.

**5704.2.7.5.2 Filling, emptying and vapor recovery connections.** Filling, emptying and vapor recovery connections to tanks containing Class I, II or IIIA liquids shall be located outside of buildings in accordance with Section 5704.2.7.5.6 at a location free from sources of ignition and not less than 5 feet (1524 mm) away from building openings or *lot lines* of property that can be built on. Such openings shall be properly identified and provided with a liquid-tight cap that shall be closed when not in use.

Filling and emptying connections to indoor tanks containing Class IIIB liquids and connected to fuel-burning equipment shall be located at a finished ground level location outside of buildings. Such openings shall be provided with a liquid-tight cap that shall be closed when not in use. A sign in accordance with Section 5003.6 that displays the following warning shall be permanently attached at the filling location:

TRANSFERRING FUEL OTHER THAN CLASS IIIB COMBUSTIBLE LIQUID TO  
THIS TANK CONNECTION IS A VIOLATION OF THE FIRE CODE AND IS STRICTLY PROHIBITED

**5704.2.7.5.3 Piping, connections and fittings.** Piping, connections, fittings and other appurtenances shall be installed in accordance with Section 5703.6.

**5704.2.7.5.4 Manual gauging.** Openings for manual gauging, if independent of the fill pipe, shall be provided with a liquid-tight cap or cover. Covers shall be kept closed when not gauging. If inside a building, such openings shall be protected against liquid overflow and possible vapor release by means of a spring-loaded check valve or other *approved device*.

**5704.2.7.5.5 Fill pipes and discharge lines.** For top-loaded tanks, a metallic fill pipe shall be designed and installed to minimize the generation of static electricity by terminating the pipe within 6 inches (152 mm) of the bottom of the tank, and it shall be installed in a manner that avoids excessive vibration.

**5704.2.7.5.5.1 Class I liquids.** For Class I liquids other than crude oil, gasoline and asphalt, the fill pipe shall be designed and installed in a manner that will minimize the possibility of generating static electricity by terminating within 6 inches (152 mm) of the bottom of the tank.

**5704.2.7.5.5.2 Underground tanks.** For underground tanks, fill pipe and discharge lines shall enter only through the top. Fill lines shall be sloped toward the tank. Underground tanks for Class I liquids having a capacity greater than 1,000 gallons (3785 L) shall be equipped with a tight fill device for connecting the fill hose to the tank.

**[S] 5704.2.7.5.6 Location of connections that are made or broken.** Filling, withdrawal and vapor-recovery connections for Class I, II and IIIA liquids that are made and broken shall be located outside of buildings, not more than 5 feet (1524 mm) above the finished ground level, in an *approved* location in close proximity to the parked delivery vehicle. Such location shall be away from sources of ignition and not less than 5 feet (1524 mm) away from building openings. Such connections shall be closed and liquid tight when not in use and shall be properly identified.

**Exception:** Fill connections for diesel fuel tanks attached to emergency generators may be located within dedicated loading docks of buildings if installed within 10 feet (3048 mm) of the exterior opening of the loading dock and if the loading dock entrance doors have openings comprising at least 50 percent of the door area.

**5704.2.7.5.7 Protection against vapor release.** Tank openings provided for purposes of vapor recovery shall be protected against possible vapor release by means of a spring-loaded check valve or dry-break connections, or other *approved* device, unless the opening is a pipe connected to a vapor processing system. Openings designed for combined fill and vapor recovery shall be protected against vapor release unless connection of the liquid delivery line to the fill pipe simultaneously connects the vapor recovery line. Connections shall be vapor tight.

**5704.2.7.5.8 Overfill prevention.** An *approved* means or method in accordance with Section 5704.2.9.7.5 shall be provided to prevent the overfill of all Class I, II and IIIA liquid storage tanks. Storage tanks in refineries, bulk plants or terminals regulated by Section 5706.4 or 5706.7 shall have overfill protection in accordance with API 2350.

An *approved* means or method in accordance with Section 5704.2.9.7.5 shall be provided to prevent the overfilling of Class IIIB liquid storage tanks connected to fuel-burning equipment inside buildings.

**Exception:** Outside above-ground tanks with a capacity of 1,320 gallons (5000 L) or less.

**5704.2.7.6 Repair, alteration or reconstruction of tanks and piping.** The repair, alteration or reconstruction, including welding, cutting and hot tapping of storage tanks and piping that have been placed in service, shall be in accordance with NFPA 30. Hot work, as defined in Section 202, on such tanks shall be conducted in accordance with Section 3510.

**5704.2.7.7 Design of supports.** The design of the supporting structure for tanks shall be in accordance with the *International Building Code* and NFPA 30.

**5704.2.7.8 Locations subject to flooding.** Where a tank is located in an area where it is subject to buoyancy because of a rise in the water table, flooding or accumulation of water from fire suppression operations, uplift protection shall be provided in accordance with Sections 22.14 and 23.14 of NFPA 30.

**5704.2.7.9 Corrosion protection.** Where subject to external corrosion, tanks shall be fabricated from corrosion-resistant materials, coated or provided with corrosion protection in accordance with Section 23.3.5 of NFPA 30.

**5704.2.7.10 Leak reporting.** A consistent or accidental loss of liquid, or other indication of a leak from a tank system, shall be reported immediately to the fire department, the *fire code official* and other authorities having jurisdiction.

**5704.2.7.10.1 Leaking tank disposition.** Leaking tanks shall be promptly emptied, repaired and returned to service, abandoned or removed in accordance with Section 5704.2.13 or 5704.2.14.

**5704.2.7.11 Tank lining.** Steel tanks are allowed to be lined only for the purpose of protecting the interior from corrosion or providing compatibility with a material to be stored. Only those liquids tested for compatibility with the lining material are allowed to be stored in lined tanks.

**5704.2.8 Vaults.** Vaults shall be allowed to be either above or below grade and shall comply with Sections 5704.2.8.1 through 5704.2.8.18.

**5704.2.8.1 Listing required.** Vaults shall be *listed* in accordance with UL 2245.

**Exception:** Where *approved* by the *fire code official*, below-grade vaults are allowed to be constructed on site, provided that the design is in accordance with the *International Building Code* and that special inspections are conducted to verify structural strength and compliance of the installation with the *approved* design in accordance with Section 1707 of the *International Building Code*. Installation plans for below-grade vaults that are constructed on site shall be prepared by, and the design shall bear the stamp of, a professional engineer. Consideration shall be given to soil and hydrostatic loading on the floors, walls and lid; anticipated seismic forces; uplifting by groundwater or flooding; and to loads imposed from above such as traffic and equipment loading on the vault lid.

**5704.2.8.2 Design and construction.** The vault shall completely enclose each tank. There shall not be openings in the vault enclosure except those necessary for access to, inspection of, and filling, emptying and venting of the tank. The

**5704.2.9.6.2 Separation between adjacent stable or unstable liquid tanks.** The separation between tanks containing stable liquids shall be in accordance with Table 22.4.2.1 of NFPA 30. Where tanks are in a diked area containing Class I or II liquids, or in the drainage path of Class I or II liquids, and are compacted in three or more rows or in an irregular pattern, the *fire code official* is authorized to require greater separation than specified in Table 22.4.2.1 of NFPA 30 or other means to make tanks in the interior of the pattern open for fire-fighting purposes.

The separation between tanks containing unstable liquids shall be not less than one-half the sum of their diameters.

**Exception:** Tanks used for storing Class IIIB liquids are allowed to be spaced 3 feet (914 mm) apart unless within a diked area or drainage path for a tank storing Class I or II liquids.

**5704.2.9.6.3 Separation between adjacent tanks containing flammable or combustible liquids and LP-gas.** The minimum horizontal separation between an LP-gas container and a Class I, II or IIIA liquid storage tank shall be 20 feet (6096 mm) except in the case of Class I, II or IIIA liquid tanks operating at pressures exceeding 2.5 psig (17.2 kPa) or equipped with emergency venting allowing pressures to exceed 2.5 psig (17.2 kPa), in which case the provisions of Section 5704.2.9.6.2 shall apply.

An *approved* means shall be provided to prevent the accumulation of Class I, II or IIIA liquids under adjacent LP-gas containers such as by dikes, diversion curbs or grading. Where *flammable* or *combustible liquid* storage tanks are within a diked area, the LP-gas containers shall be outside the diked area and not less than 10 feet (3048 mm) away from the centerline of the wall of the diked area.

**Exceptions:**

1. Liquefied petroleum gas containers of 125 gallons (473 L) or less in capacity installed adjacent to fuel-oil supply tanks of 660 gallons (2498 L) or less in capacity.
2. Horizontal separation is not required between above-ground LP-gas containers and underground *flammable* and *combustible liquid* tanks.

**5704.2.9.7 Additional requirements for protected above-ground tanks.** In addition to the requirements of this chapter for above-ground tanks, the installation of protected above-ground tanks shall be in accordance with Sections 5704.2.9.7.1 through 5704.2.9.7.9.

**5704.2.9.7.1 Tank construction.** The construction of a protected above-ground tank and its primary tank shall be in accordance with Section 5704.2.7.

**5704.2.9.7.2 Normal and emergency venting.** Normal and emergency venting for protected above-ground tanks shall be provided in accordance with Sections 5704.2.7.3 and 5704.2.7.4. The vent capacity reduction factor shall not be allowed.

**[S] 5704.2.9.7.3 Secondary containment.** Protected above-ground tanks shall be provided with secondary containment, drainage control or diking in accordance with Section 5004.2. A means shall be provided to establish the integrity of the secondary containment in accordance with NFPA 30.

**Exception:** Double wall tanks where all piping connections to the tank are located above the maximum liquid level, and a means is provided to prevent the release of liquids from the tank by siphon.

**5704.2.9.7.4 Vehicle impact protection.** Where protected above-ground tanks, piping, electrical conduit or dispensers are subject to vehicular impact, they shall be protected therefrom, either by having the impact protection incorporated into the system design in compliance with the impact test protocol of UL 2085, or by meeting the provisions of Section 312, or where necessary, a combination of both. Where guard posts or other *approved* barriers are provided, they shall be independent of each above-ground tank.

**5704.2.9.7.5 Overfill prevention.** Protected above-ground tanks shall not be filled in excess of 95 percent of their capacity. An overfill prevention system shall be provided for each tank. During tank-filling operations, the system shall comply with one of the following:

1. The overfill prevention system shall include the following:
  - 1.1. An independent means of notifying the person filling the tank that the fluid level has reached 90 percent of tank capacity by providing an audible or visual alarm signal, providing a tank level gauge marked at 90 percent of tank capacity, or other *approved* means.
  - 1.2. Automatic shut off of the flow of fuel to the tank when the quantity of liquid in the tank reaches 95 percent of tank capacity. For rigid hose fuel-delivery systems, an *approved* means shall be provided to empty the fill hose into the tank after the automatic shutoff device is activated.
2. The system shall reduce the flow rate to not more than 15 gallons per minute (0.95 L/s) so that at the reduced flow rate, the tank will not overfill for 30 minutes, and automatically shut off flow into the tank so that none of the fittings on the top of the tank are exposed to product because of overfilling.

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**5704.2.9.7.5.1 Information signs.** A permanent sign shall be provided at the fill point for the tank, documenting the filling procedure and the tank calibration chart.

**Exception:** Where climatic conditions are such that the sign may be obscured by ice or snow, or weathered beyond readability or otherwise impaired, said procedures and chart shall be located in the office window, lock box or other area available to the person filling the tank.

**5704.2.9.7.5.2 Determination of available tank capacity.** The filling procedure shall require the person filling the tank to determine the gallonage (literage) required to fill it to 90 percent of capacity before commencing the fill operation.

**5704.2.9.7.6 Fill pipe connections.** The fill pipe shall be provided with a means for making a direct connection to the tank vehicle's fuel delivery hose so that the delivery of fuel is not exposed to the open air during the filling operation. Where any portion of the fill pipe exterior to the tank extends below the level of the top of the tank, a check valve shall be installed in the fill pipe not more than 12 inches (305 mm) from the fill hose connection.

**5704.2.9.7.7 Spill containers.** A spill container having a capacity of not less than 5 gallons (19 L) shall be provided for each fill connection. For tanks with a top fill connection, spill containers shall be noncombustible and shall be fixed to the tank and equipped with a manual drain valve that drains into the primary tank. For tanks with a remote fill connection, a portable spill container shall be allowed.

**5704.2.9.7.8 Tank openings.** Tank openings in protected above-ground tanks shall be through the top only.

**5704.2.9.7.9 Antisiphon devices.** *Approved* antisiphon devices shall be installed in each external pipe connected to the protected above-ground tank where the pipe extends below the level of the top of the tank.

**5704.2.10 Drainage and diking.** The area surrounding a tank or group of tanks shall be provided with drainage control or shall be diked to prevent accidental discharge of liquid from endangering adjacent tanks, adjoining property or reaching waterways.

### Exceptions:

1. The *fire code official* is authorized to alter or waive these requirements based on a technical report that demonstrates that such tank or group of tanks does not constitute a hazard to other tanks, waterways or adjoining property, after consideration of special features such as topographical conditions, nature of occupancy and proximity to buildings on the same or adjacent property, capacity, and construction of proposed tanks and character of liquids to be stored, and nature and quantity of private and public fire protection provided.
2. Drainage control and diking is not required for *listed* secondary containment tanks.

**5704.2.10.1 Volumetric capacity.** The volumetric capacity of the diked area shall be not less than the greatest amount of liquid that can be released from the largest tank within the diked area. The capacity of the diked area enclosing more than one tank shall be calculated by deducting the volume of the tanks other than the largest tank below the height of the dike.

**5704.2.10.2 Diked areas containing two or more tanks.** Diked areas containing two or more tanks shall be subdivided in accordance with NFPA 30.

**5704.2.10.3 Protection of piping from exposure fires.** Piping shall not pass through adjacent diked areas or impounding basins, unless provided with a sealed sleeve or otherwise protected from exposure to fire.

**5704.2.10.4 Combustible materials in diked areas.** Diked areas shall be kept free from combustible materials, drums and barrels.

**5704.2.10.5 Equipment, controls and piping in diked areas.** Pumps, manifolds and fire protection equipment or controls shall not be located within diked areas or drainage basins or in a location where such equipment and controls would be endangered by fire in the diked area or drainage basin. Piping above ground shall be minimized and located as close as practical to the shell of the tank in diked areas or drainage basins.

### Exceptions:

1. Pumps, manifolds and piping integral to the tanks or equipment being served, which is protected by intermediate diking, berms, drainage or fire protection such as water spray, monitors or resistive coating.
2. Fire protection equipment or controls that are appurtenances to the tanks or equipment being protected, such as foam chambers or foam piping and water or foam monitors and hydrants, or hand and wheeled extinguishers.

**[W] 5704.2.11 Underground tanks.** Underground storage of *flammable* and *combustible liquids* in tanks shall comply with Section 5704.2 and Sections 5704.2.11.1 through 5704.2.11.4.2.1. Corrosion protection shall comply with WAC 173-360-305.

**5704.2.11.1 Location.** *Flammable and combustible liquid* storage tanks located underground, either outside or under buildings, shall be in accordance with all of the following:

1. Tanks shall be located with respect to existing foundations and supports such that the loads carried by the latter cannot be transmitted to the tank.
2. The distance from any part of a tank storing liquids to the nearest wall of a *basement*, pit, cellar or *lot line* shall be not less than 3 feet (914 mm).
3. A minimum distance of 1 foot (305 mm), shell to shell, shall be maintained between underground tanks.

**5704.2.11.2 Depth and cover.** Excavation for underground storage tanks shall be made with due care to avoid undermining of foundations of existing structures. Underground tanks shall be set on firm foundations and surrounded with not less than 6 inches (152 mm) of noncorrosive inert material, such as clean sand.

**5704.2.11.3 Overfill protection and prevention systems.** Fill pipes shall be equipped with a spill container and an overfill prevention system in accordance with NFPA 30.

**5704.2.11.4 Leak prevention.** Leak prevention for underground tanks shall comply with Sections 5704.2.11.4.1 and 5704.2.11.4.2.

**5704.2.11.4.1 Inventory control.** Daily inventory records for underground storage tank systems shall be maintained.

**5704.2.11.4.2 Leak detection.** Underground storage tank systems shall be provided with an *approved* method of leak detection from any component of the system that is designed and installed in accordance with NFPA 30.

**5704.2.11.4.2.1 Location.** The leak detection panel status shall be annunciated at an *approved* on-site location.

**5704.2.12 Testing.** Tank testing shall comply with Sections 5704.2.12.1 and 5704.2.12.2.

**5704.2.12.1 Acceptance testing.** Prior to being placed into service, tanks shall be tested in accordance with Section 21.5 of NFPA 30.

**5704.2.12.2 Testing of underground tanks.** Before being covered or placed in use, tanks and piping connected to underground tanks shall be tested for tightness in the presence of the *fire code official*. Piping shall be tested in accordance with Section 5703.6.3. The system shall not be covered until it has been *approved*.

[S] **5704.2.13 Abandonment and status of tanks.** Tanks taken out of service shall be removed in accordance with Section 5704.2.14, or safeguarded in accordance with Sections 5704.2.13.1 through 5704.2.13.2.3 and API 1604.

Residential heating oil tanks required by this code to be removed or decommissioned shall also comply with Administrative Rule 34.02.07, *Decommissioning Residential Heating Oil Tanks*, and any future revisions of this rule adopted by the *fire code official*.

**5704.2.13.1 Underground tanks.** Underground tanks taken out of service shall comply with Sections 5704.2.13.1.1 through 5704.2.13.1.5.

**5704.2.13.1.1 Temporarily out of service.** Underground tanks temporarily out of service shall have the fill line, gauge opening, vapor return and pump connection secure against tampering. Vent lines shall remain open and be maintained in accordance with Sections 5704.2.7.3 and 5704.2.7.4.

**5704.2.13.1.2 Out of service for 90 days.** Underground tanks not used for a period of 90 days shall be safeguarded in accordance with all the following or be removed in accordance with Section 5704.2.14:

1. *Flammable or combustible liquids* shall be removed from the tank.
2. All piping, including fill line, gauge opening, vapor return and pump connection, shall be capped or plugged and secured from tampering.
3. Vent lines shall remain open and be maintained in accordance with Sections 5704.2.7.3 and 5704.2.7.4.

**5704.2.13.1.3 Out of service for one year.** Underground tanks that have been out of service for a period of one year shall be removed from the ground in accordance with Section 5704.2.14 or abandoned in place in accordance with Section 5704.2.13.1.4.

**5704.2.13.1.4 Tanks abandoned in place.** Tanks abandoned in place shall be as follows:

1. *Flammable and combustible liquids* shall be removed from the tank and connected piping.
2. The suction, inlet, gauge, vapor return and vapor lines shall be disconnected.
3. The tank shall be filled completely with an *approved* inert solid material.
4. Remaining underground piping shall be capped or plugged.
5. A record of tank size, location and date of abandonment shall be retained.
6. All exterior above-grade fill piping shall be permanently removed when tanks are abandoned or removed.

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**5704.3.3.10 Containers in piles.** Containers in piles shall be stacked in such a manner as to provide stability and to prevent excessive stress on container walls. Portable tanks stored more than one tier high shall be designed to nest securely, without dunnage. Material-handling equipment shall be suitable to handle containers and tanks safely at the upper tier level.

**5704.3.4 Quantity limits for storage.** Liquid storage quantity limitations shall comply with Sections 5704.3.4.1 through 5704.3.4.4.

**[S] 5704.3.4.1 Maximum allowable quantity per control area.** For occupancies other than Group M wholesale and retail sales uses and Group B non-production laboratories, indoor storage of *flammable* and *combustible liquids* shall not exceed the *maximum allowable quantities per control area* indicated in Table 5003.1.1(1) and shall not exceed the additional limitations set forth in this section.

For Group M occupancy wholesale and retail sales uses, indoor storage of *flammable* and *combustible liquids* shall not exceed the *maximum allowable quantities per control area* indicated in Table 5704.3.4.1. For Group B non-production laboratories, indoor storage of *flammable* and *combustible liquids* is allowed to be in accordance with Table 5003.13 and Section 5003.13.

Storage of hazardous production material *flammable* and *combustible liquids* in Group H-5 occupancies shall be in accordance with Chapter 27.

**TABLE 5704.3.4.1  
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF  
FLAMMABLE AND COMBUSTIBLE LIQUIDS IN WHOLESALE AND RETAIL SALES OCCUPANCIES<sup>a</sup>**

TYPE OF LIQUID	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA (gallons)		
	Sprinklered <sup>b</sup> in accordance with footnote densities and arrangements	Sprinklered in accordance with Tables 5704.3.6.3(4) through 5704.3.6.3(8) and Table 5704.3.7.5.1	Nonsprinklered
Class IA	60	60	30
Class IB, IC, II and IIIA	7,500 <sup>c</sup>	15,000 <sup>c</sup>	1,600
Class IIIB	Unlimited	Unlimited	13,200

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m<sup>2</sup>, 1 gallon = 3.785 L, 1 gallon per minute per square foot = 40.75 L/min/m<sup>2</sup>.

- a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.
- b. To be considered as sprinklered, a building shall be equipped throughout with an *approved* automatic sprinkler system with a design providing minimum densities as follows:
  - 1. For uncartoned commodities on shelves 6 feet or less in height where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of Ordinary Hazard Group 2.
  - 2. For cartoned, palletized or racked commodities where storage is 4 feet 6 inches or less in height and where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of 0.21 gallon per minute per square foot over the most remote 1,500-square-foot area.
- c. Where wholesale and retail sales or storage areas exceed 50,000 square feet in area, the maximum allowable quantities are allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. A control area separation is not required. The cumulative amounts, including amounts attained by having an additional control area, shall not exceed 30,000 gallons.

**5704.3.4.2 Occupancy quantity limits.** The following limits for quantities of stored *flammable* or *combustible liquids* shall not be exceeded:

- 1. Group A occupancies: Quantities in Group A occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
- 2. Group B occupancies: Quantities in drinking, dining, office and school uses within Group B occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
- 3. Group E occupancies: Quantities in Group E occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
- 4. Group F occupancies: Quantities in dining, office, and school uses within Group F occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
- 5. Group I occupancies: Quantities in Group I occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
- 6. Group M occupancies: Quantities in dining, office, and school uses within Group M occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment,



and shall not exceed quantities set forth in Table 5003.1.1(1). The maximum allowable quantities for storage in wholesale and retail sales areas shall be in accordance with Section 5704.3.4.1.

7. Group R occupancies: Quantities in Group R occupancies shall not exceed that necessary for maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
8. Group S occupancies: Quantities in dining and office uses within Group S occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).

**5704.3.4.3 Quantities exceeding limits for control areas.** Quantities exceeding those allowed in *control areas* set forth in Section 5704.3.4.1 shall be in liquid storage rooms or liquid storage warehouses in accordance with Sections 5704.3.7 and 5704.3.8.

**[S] 5704.3.4.4 Liquids for maintenance and operation of equipment.** In all occupancies, quantities of *flammable* and *combustible liquids* in excess of 10 gallons (38 L) used for maintenance purposes, demonstration, treatment, and laboratory work, and the operation of equipment shall be stored in liquid storage cabinets in accordance with Section 5704.3.2. Quantities not exceeding 10 gallons (38 L) are allowed to be stored outside of a cabinet where in *approved* containers located in private garages or other *approved* locations.

**5704.3.5 Storage in control areas.** Storage of *flammable* and *combustible liquids* in *control areas* shall be in accordance with Sections 5704.3.5.1 through 5704.3.5.4.

**5704.3.5.1 Basement storage.** Class I liquids shall be allowed to be stored in *basements* in amounts not exceeding the *maximum allowable quantity per control area* for use-open systems in Table 5003.1.1(1), provided that *fire protection systems* are provided in accordance with Chapter 9. Class II and IIIA liquids shall be allowed to be stored in *basements*, provided that automatic suppression and other fire protection are provided in accordance with Chapter 9.

**5704.3.5.2 Storage pile heights.** Containers having less than a 30-gallon (114 L) capacity that contain Class I or II liquids shall not be stacked more than 3 feet (914.4 mm) or two containers high, whichever is greater, unless stacked on fixed shelving or otherwise satisfactorily secured. Containers of Class I or II liquids having a capacity of 30 gallons (114 L) or more shall not be stored more than one container high. Containers shall be stored in an upright position.

**5704.3.5.3 Storage distance from ceilings and roofs.** Piles of containers or portable tanks shall not be stored closer than 3 feet (914 mm) to the nearest beam, chord, girder or other obstruction, and shall be 3 feet (914 mm) below sprinkler deflectors or discharge orifices of water spray or other overhead *fire protection system*.

**5704.3.5.4 Combustible materials.** In areas that are not open to the public, Class I, II and IIIA liquids shall not be stored in the same pile or rack section as ordinary combustible commodities unless such materials are packaged together as kits.

**5704.3.6 Wholesale and retail sales uses.** *Flammable* and *combustible liquids* in Group M occupancy wholesale and retail sales uses shall be in accordance with Sections 5704.3.6.1 through 5704.3.6.5, or Sections 10.10.2, 12.3.6, 16.4.1 through 16.4.3, 16.5.1 through 16.5.2.12, Figures 16.4.1(a) through 16.4.1(c) and Tables 16.5.2.1 through 16.5.2.12, of NFPA 30.

**5704.3.6.1 Container type.** Containers for Class I liquids shall be metal.

**Exception:** In sprinklered buildings, an aggregate quantity of 120 gallons (454 L) of water-miscible Class IB and Class IC liquids is allowed in non-metallic containers, each having a capacity of 16 ounces (0.473 L) or less.

**5704.3.6.2 Container capacity.** Containers for Class I liquids shall not exceed a capacity of 5 gallons (19 L).

**Exception:** Metal containers not exceeding 55 gallons (208 L) are allowed to store up to 240 gallons (908 L) of the *maximum allowable quantity per control area* of Class IB and IC liquids in a *control area*. The building shall be equipped throughout with an *approved automatic sprinkler system* in accordance with Table 5704.3.4.1. The containers shall be provided with plastic caps without cap seals and shall be stored upright. Containers shall not be stacked or stored in racks and shall not be located in areas open to the public.

**5704.3.6.3 Fire protection and storage arrangements.** Fire protection and container storage arrangements shall be in accordance with Table 5704.3.6.3(1) or the following:

1. Storage on shelves shall not exceed 6 feet (1829 mm) in height, and shelving shall be metal.
2. Storage on pallets or in piles greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height, shall be protected in accordance with Table 5704.3.6.3(4), and the storage heights and arrangements shall be limited to those specified in Table 5704.3.6.3(2).
3. Storage on racks greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height shall be protected in accordance with Tables 5704.3.6.3(5), 5704.3.6.3(6), and 5704.3.6.3(7) as appropriate, and the storage heights and arrangements shall be limited to those specified in Table 5704.3.6.3(3).

Combustible commodities shall not be stored above *flammable* and *combustible liquids*.

**5705.3.4 Location of processing vessels.** Processing vessels shall be located with respect to distances to *lot lines* of adjoining property that can be built on, in accordance with Tables 5705.3.4(1) and 5705.3.4(2).

**Exception:** Where the exterior wall facing the adjoining *lot line* is a blank wall having a *fire-resistance rating* of not less than 4 hours, the *fire code official* is authorized to modify the distances. The distance shall be not less than that set forth in the *International Building Code*, and where Class IA or unstable liquids are involved, explosion control shall be provided in accordance with Section 911.

**TABLE 5705.3.4(1)  
SEPARATION OF PROCESSING VESSELS FROM LOT LINES**

PROCESSING VESSELS WITH EMERGENCY RELIEF VENTING	LOCATION <sup>a</sup>	
	Stable liquids	Unstable liquids
Not in excess of 2.5 psig	Table 5705.3.4(2)	2.5 times Table 5705.3.4(2)
Over 2.5 psig	1.5 times Table 5705.3.4(2)	4 times Table 5705.3.4(2)

For SI: 1 pound per square inch gauge = 6.895 kPa.

a. Where protection of exposures by a public fire department or private fire brigade capable of providing cooling water streams on structures is not provided, distances shall be doubled.

**TABLE 5705.3.4(2)  
REFERENCE TABLE FOR USE WITH TABLE 5705.3.4(1)**

TANK CAPACITY (gallons)	MINIMUM DISTANCE FROM LOT LINE OF A LOT THAT IS OR CAN BE BUILT ON, INCLUDING THE OPPOSITE SIDE OF A PUBLIC WAY (feet)	MINIMUM DISTANCE FROM NEAREST SIDE OF ANY PUBLIC WAY OR FROM NEAREST IMPORTANT BUILDING ON THE SAME PROPERTY (feet)
275 or less	5	5
276 to 750	10	5
751 to 12,000	15	5
12,001 to 30,000	20	5
30,001 to 50,000	30	10
50,001 to 100,000	50	15
100,001 to 500,000	80	25
500,001 to 1,000,000	100	35
1,000,001 to 2,000,000	135	45
2,000,001 to 3,000,000	165	55
3,000,001 or more	175	60

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

**5705.3.5 Quantity limits for use.** Liquid use quantity limitations shall comply with Sections 5705.3.5.1 through 5705.3.5.3.

**[S] 5705.3.5.1 Maximum allowable quantity per control area.** Indoor use, dispensing and mixing of *flammable* and *combustible liquids* shall not exceed the *maximum allowable quantity per control area* indicated in Table 5003.1.1(1) and shall not exceed the additional limitations set forth in Section 5705.3.5.

Use of hazardous production material *flammable* and *combustible liquids* in Group H-5 occupancies shall be in accordance with Chapter 27.

**Exceptions:**

1. Cleaning with Class I, II and IIIA liquids shall be in accordance with Section 5705.3.6.
2. Group B non-production laboratories in accordance with Table 5003.8.3.3 and Section 5003.13.

**5705.3.5.2 Occupancy quantity limits.** The following limits for quantities of *flammable* and *combustible liquids* used, dispensed or mixed based on occupancy classification shall not be exceeded:

1. Group A occupancies: Quantities in Group A occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
2. Group B occupancies: Quantities in drinking, dining, office and school uses within Group B occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
3. Group E occupancies: Quantities in Group E occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment and shall not exceed quantities set forth in Table 5003.1.1(1).

**5705.3.6.2.5 Separation.** Multiple machines shall be separated from each other by a distance of not less than 30 feet (9144 mm) or by a *fire barrier* with a minimum 1-hour *fire-resistance rating*.

**5705.3.6.2.6 Ventilation.** Machines shall be located in areas adequately ventilated to prevent accumulation of vapors.

**5705.3.6.2.7 Installation.** Machines shall be installed in accordance with their listings.

**5705.3.7 Rooms or buildings for quantities exceeding the maximum allowable quantity per control area.** Where required by Section 5705.3.5.3 or 5705.3.6.1, rooms or buildings used for the use, dispensing or mixing of *flammable* and *combustible liquids* in quantities exceeding the *maximum allowable quantity per control area* shall be in accordance with Sections 5705.3.7.1 through 5705.3.7.6.3.

**5705.3.7.1 Construction, location and fire protection.** Rooms or buildings classified in accordance with the *International Building Code* as Group H-2 or H-3 occupancies based on use, dispensing or mixing of *flammable* or *combustible liquids* shall be constructed in accordance with the *International Building Code*.

**5705.3.7.2 Basements.** In rooms or buildings classified in accordance with the *International Building Code* as Group H-2 or H-3, dispensing or mixing of *flammable* or *combustible liquids* shall not be conducted in *basements*.

**5705.3.7.3 Fire protection.** Rooms or buildings classified in accordance with the *International Building Code* as Group H-2 or H-3 occupancies shall be equipped with an *approved* automatic fire-extinguishing system in accordance with Chapter 9.

**5705.3.7.4 Doors.** Interior doors to rooms or portions of such buildings shall be self-closing fire doors in accordance with the *International Building Code*.

**5705.3.7.5 Open systems.** Use, dispensing and mixing of *flammable* and *combustible liquids* in *open systems* shall be in accordance with Sections 5705.3.7.5.1 through 5705.3.7.5.3.

**5705.3.7.5.1 Ventilation.** Continuous mechanical ventilation shall be provided at a rate of not less than 1 cfm per square foot [ $0.00508 \text{ m}^3/(\text{s} \times \text{m}^2)$ ] of floor area over the design area. Provisions shall be made for introduction of makeup air in such a manner to include all floor areas or pits where vapors can collect. Local or spot ventilation shall be provided where needed to prevent the accumulation of hazardous vapors. Ventilation system design shall comply with the *International Building Code* and *International Mechanical Code*.

**Exception:** Where natural ventilation can be shown to be effective for the materials used, dispensed or mixed.

**5705.3.7.5.2 Explosion control.** Explosion control shall be provided in accordance with Section 911.

**[S] 5705.3.7.5.3 Spill control and secondary containment.** Spill control shall be provided in accordance with Section 5703.4 where Class I, II or IIIA liquids are dispensed into containers exceeding a 1.3-gallon (5 L) capacity or mixed or used in open containers or systems exceeding a 5.3-gallon (20 L) capacity. Spill control and secondary containment shall be provided in accordance with Section 5703.4 where the capacity of an individual container exceeds 55 gallons (208 L) or the aggregate capacity of multiple containers or tanks exceeds 100 gallons (378.5 L).

**Exception:** Double wall tanks where all piping connections to the tank are located above the maximum liquid level, and a means is provided to prevent the release of liquids from the tank by siphon.

**5705.3.7.6 Closed systems.** Use or mixing of *flammable* or *combustible liquids* in *closed systems* shall be in accordance with Sections 5705.3.7.6.1 through 5705.3.7.6.3.

**5705.3.7.6.1 Ventilation.** *Closed systems* designed to be opened as part of normal operations shall be provided with ventilation in accordance with Section 5705.3.7.5.1.

**5705.3.7.6.2 Explosion control.** Explosion control shall be provided where an explosive environment can occur as a result of the mixing or use process. Explosion control shall be designed in accordance with Section 911.

**Exception:** Where process vessels are designed to contain fully the worst-case explosion anticipated within the vessel under process conditions considering the most likely failure.

**5705.3.7.6.3 Spill control and secondary containment.** Spill control shall be provided in accordance with Section 5703.4 where *flammable* or *combustible liquids* are dispensed into containers exceeding a 1.3-gallon (5 L) capacity or mixed or used in open containers or systems exceeding a 5.3-gallon (20 L) capacity. Spill control and secondary containment shall be provided in accordance with Section 5703.4 where the capacity of an individual container exceeds 55 gallons (208 L) or the aggregate capacity of multiple containers or tanks exceeds 1,000 gallons (3785 L).

**5705.3.8 Use, dispensing and handling outside of buildings.** Outside use, dispensing and handling shall be in accordance with Sections 5705.3.8.1 through 5705.3.8.4.

Dispensing of liquids into motor vehicle fuel tanks at motor fuel-dispensing facilities shall be in accordance with Chapter 23.

**5706.5.4.2 Emergency refueling.** Where *approved* by the *fire code official*, dispensing of motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles is allowed during emergencies. Dispensing from tank vehicles shall be in accordance with Sections 5706.2.8 and 5706.6.

**5706.5.4.3 Aircraft fueling.** Transfer of liquids from tank vehicles to the fuel tanks of aircraft shall be in accordance with Chapter 20.

**5706.5.4.4 Fueling of vehicles at farms, construction sites and similar areas.** Transfer of liquid from tank vehicles to motor vehicles for private use on farms and rural areas and at construction sites, earth-moving projects, gravel pits and borrow pits is allowed in accordance with Section 5706.2.8.

**[W][S] 5706.5.4.5 Commercial, industrial, governmental or manufacturing.** Dispensing of Class I, II and III motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles located at commercial, industrial, governmental or manufacturing establishments is allowed where (~~permitted~~) *approved*, provided that such dispensing operations are conducted in accordance with the following:

1. Dispensing shall occur only at sites that have been issued a permit to conduct mobile fueling.
2. The *owner* of a mobile fueling operation shall provide to the jurisdiction a written response plan that demonstrates readiness to respond to a fuel spill and carry out appropriate mitigation measures, and describes the process to dispose properly of contaminated materials.
3. A detailed site plan shall be submitted with each application for a permit. The site plan shall indicate: all buildings, structures and appurtenances on site and their use or function; all uses adjacent to the *lot lines* of the site; the locations of all storm drain openings, adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained on the site property; and the scale of the site plan.  
Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings or off-site. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills or other *approved* means.
4. The *fire code official* is allowed to impose limits on the times and days during which mobile fueling operations is allowed to take place, and specific locations on a site where fueling is permitted.
5. Mobile fueling operations shall be conducted in areas not open to the public or shall be limited to times when the public is not present.
6. Mobile fueling shall not take place within 15 feet (4572 mm) of buildings, property lines, combustible storage or storm drains.

**Exceptions:**

1. The distance to storm drains shall not apply where an *approved* storm drain cover or an *approved* equivalent that will prevent any fuel from reaching the drain is in place prior to fueling or a fueling hose being placed within 15 feet (4572 mm) of the drain. Where placement of a storm drain cover will cause the accumulation of excessive water or difficulty in conducting the fueling, such cover shall not be used and the fueling shall not take place within 15 feet (4572 mm) of a drain.
2. The distance to storm drains shall not apply for drains that direct influent to *approved* oil interceptors.
7. The tank vehicle shall comply with the requirements of NFPA 385 and local, state and federal requirements. The tank vehicle's specific functions shall include that of supplying fuel to motor vehicle fuel tanks. The vehicle and all its equipment shall be maintained in good repair.
8. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the tank vehicle or the point of fueling shall be prominently posted on three sides of the vehicle including the back and both sides.
9. A portable fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.
10. The dispensing nozzles and hoses shall be of an *approved* and *listed* type.
11. The dispensing hose shall not be extended from the reel more than 100 feet (30 480 mm) in length.
- ~~12. Absorbent materials, nonwater absorbent pads, a 10-foot-long (3048 mm) containment boom, an *approved* container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.~~
12. Fuel delivery vehicles shall be equipped with spill cleanup supplies in accordance with the Department of Ecology's Source Control Best Management Practices. Such supplies shall be readily available for deployment by the operator at all times and include nonwatery absorbents capable of absorbing 15 gallons (56.76 L) of diesel fuel, storm drain plug or cover kit, a nonwater absorbent containment boom or a minimum 10-foot-long (3048 mm) length with a 12-gallon (45.41 L) absorbent capacity, a nonmetallic shovel, and two 5-gallon (19 L) buckets with lids.

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13. Tank vehicles shall be equipped with a “fuel limit” switch such as a count-back switch, to limit the amount of a single fueling operation to not more than 500 gallons (1893 L) before resetting the limit switch.  
**Exception:** Tank vehicles where the operator carries and can utilize a remote emergency shutoff device that, when activated, immediately causes flow of fuel from the tank vehicle to cease.
14. Persons responsible for dispensing operations shall be trained in the appropriate mitigating actions in the event of a fire, leak or spill. Training records shall be maintained by the dispensing company.
15. Operators of tank vehicles used for mobile fueling operations shall have in their possession at all times an emergency communications device to notify the proper authorities in the event of an emergency.
16. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.
17. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.
18. The engines of vehicles being fueled shall be shut off during dispensing operations.
19. Nighttime fueling operations shall only take place in adequately lighted areas.
20. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.
21. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.
22. Motor vehicle fuel tanks shall not be topped off.
23. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the tank vehicle.
24. The *fire code official* and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.
25. Operators shall place a drip pan or an absorbent pillow under each fuel fill opening prior to and during dispensing operations. Drip pans shall be liquid-tight. The pan or absorbent pillow shall have a capacity of not less than 3 gallons (11.36 L). Spills retained in the drip pan or absorbent pillow need not be reported. Operators, when fueling, shall have on their person an absorbent pad capable of capturing diesel fuel overfills. Except during fueling, the nozzle shall face upward and an absorbent pad shall be kept under the nozzle to catch drips. Contaminated absorbent pads or pillows shall be disposed of regularly in accordance with local, state and federal requirements.

**5706.6 Tank vehicles and vehicle operation.** Tank vehicles shall be designed, constructed, equipped and maintained in accordance with NFPA 385 and Sections 5706.6.1 through 5706.6.4.

**5706.6.1 Operation of tank vehicles.** Tank vehicles shall be utilized and operated in accordance with NFPA 385 and Sections 5706.6.1.1 through 5706.6.1.11.

**5706.6.1.1 Vehicle maintenance.** Tank vehicles shall not be operated unless they are in proper state of repair and free from accumulation of grease, oil or other flammable substance, and leaks.

**5706.6.1.2 Leaving vehicle unattended.** The driver, operator or attendant of a tank vehicle shall not remain in the vehicle cab and shall not leave the vehicle while it is being filled or discharged. The delivery hose, when attached to a tank vehicle, shall be considered to be a part of the tank vehicle.

**5706.6.1.3 Vehicle motor shutdown.** Motors of tank vehicles or tractors shall be shut down during the making or breaking of hose connections. If loading or unloading is performed without the use of a power pump, the tank vehicle or tractor motor shall be shut down throughout such operations.

**5706.6.1.4 Outage.** A cargo tank or compartment thereof used for the transportation of *flammable* or *combustible liquids* shall not be loaded to absolute capacity. The vacant space in a cargo tank or compartment thereof used in the transportation of *flammable* or *combustible liquids* shall be not less than 1 percent. Sufficient space shall be left vacant to prevent leakage from or distortion of such tank or compartment by expansion of the contents caused by rise in temperature in transit.

**5706.6.1.5 Overfill protection.** The driver, operator or attendant of a tank vehicle shall, before making delivery to a tank, determine the unfilled capacity of such tank by a suitable gauging device. To prevent overfilling, the driver, operator or attendant shall not deliver in excess of that amount.

**5706.6.1.6 Securing hatches.** During loading, hatch covers shall be secured on all but the receiving compartment.

**5706.6.1.7 Liquid temperature.** Materials shall not be loaded into or transported in a tank vehicle at a temperature above the material’s ignition temperature unless safeguarded in an *approved* manner.

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**5706.7.3 Storage of heated petroleum products.** Where petroleum-derived asphalts and residues are stored in heated tanks at refineries and bulk storage facilities or in tank vehicles, such products shall be in accordance with API 2023.

**5706.8 Vapor recovery and vapor-processing systems.** Vapor-processing systems in which the vapor source operates at pressures from vacuum, up to and including 1 psig (6.9 kPa) or in which a potential exists for vapor mixtures in the flammable range, shall comply with Sections 5706.8.1 through 5706.8.5.

### Exceptions:

1. Marine systems complying with federal transportation waterway regulations such as DOTn 33 CFR Parts 154 through 156, and CGR 46 CFR Parts 30, 32, 35 and 39.
2. Motor fuel-dispensing facility systems complying with Chapter 23.

**5706.8.1 Over-pressure/vacuum protection.** Tanks and equipment shall have independent venting for over-pressure or vacuum conditions that might occur from malfunction of the vapor recovery or processing system.

**Exception:** For tanks, venting shall comply with Section 5704.2.7.3.

**5706.8.2 Vent location.** Vents on vapor-processing equipment shall be not less than 12 feet (3658 mm) from adjacent ground level, with outlets located and directed so that flammable vapors will disperse to below the lower flammable limit (LFL) before reaching locations containing potential ignition sources.

**5706.8.3 Vapor collection systems and overfill protection.** The design and operation of the vapor collection system and overfill protection shall be in accordance with this section and Section 19.5 of NFPA 30.

**5706.8.4 Liquid-level monitoring.** A liquid knock-out vessel used in the vapor collection system shall have means to verify the liquid level and a high-liquid-level sensor that activates an alarm. For unpopulated facilities, the high-liquid-level sensor shall initiate the shutdown of liquid transfer into the vessel and shutdown of vapor recovery or vapor-processing systems.

**5706.8.5 Overfill protection.** Storage tanks served by vapor recovery or processing systems shall be equipped with overfill protection in accordance with Section 5704.2.7.5.8.

## SECTION 5707 ON-DEMAND MOBILE FUELING OPERATIONS

**5707.1 General.** On-demand mobile fueling operations that dispense Class I, II and III liquids into the fuel tanks of motor vehicles shall comply with Sections 5707.1 through 5707.6.6.

**Exception:** Fueling from an *approved* portable container in cases of an emergency or for personal use.

**5707.1.1 Approval required.** Mobile fueling operations shall not be conducted without first obtaining a *permit* and approval from the *fire code official*. Mobile fueling operations shall occur only at *approved* locations. The *fire code official* is authorized to approve individual locations or geographic areas where mobile fueling is allowed.

**[W] 5707.1.2 Coordination of permits.** Permits across multiple authorities having jurisdiction shall be coordinated in accordance with Sections 5707.1.2.1 through 5707.1.2.4.

**5707.1.2.1 Acceptance of permits issued by other authorities having jurisdiction.** Local authorities having jurisdiction that allow mobile on demand fueling trucks may accept conforming permits issued and/or inspections performed by any other local authorities having jurisdiction in Washington State. Local authorities having jurisdiction that choose to accept conforming permits issued by other local authorities having jurisdiction in Washington State retain the right to enforce the provisions of this section.

**5707.1.2.2 Local authorities having jurisdiction not offering operator or truck certification.** A conforming operator or vehicle permit issued by one local authority having jurisdiction shall be recognized and accepted by all local authorities having jurisdiction in Washington State, if those local authorities having jurisdiction allow mobile on-demand fueling and do not offer such operator or truck certification. Under no circumstances will an issuing local authority having jurisdiction be expected to perform permissive inspections beyond their jurisdiction.

**5707.1.2.3 Commencing permit issuance.** When a local authority having jurisdiction that has previously authorized mobile fueling operations but not issued their own permits commences permit issuance for mobile fueling operations or vehicles, that local authority having jurisdiction shall continue to accept permits previously issued by another local authority having jurisdiction in Washington State for three months or until their expiration date, whichever is sooner.

**5707.1.2.4 Permit record maintenance.** Issuing local authorities having jurisdiction shall maintain a publicly available list of current permits or other information source to enable all parties to have information about whether permits are in good standing.

[W] **5707.2 Mobile fueling vehicle.** An on-demand mobile fueling vehicle shall be ~~((that which is))~~ utilized in on-demand fueling operations for the dispensing of Class I, II or III liquids into the fuel tanks of motor vehicles and shall comply with Sections 5707.2.1 and 5707.2.2.

**5707.2.1 Mobile fueling vehicle classifications.** An on-demand mobile fueling vehicle shall be ~~((characterized))~~ classified as one of the following:

1. ~~((Tier))~~ Type 1 mobile fueling vehicle. A tank vehicle that complies with NFPA 385 and that has chassis-mounted tanks where the aggregate capacity does not exceed 1,600 gallons (6057 L).
2. ~~((Tier))~~ Type 2 mobile fueling vehicle. A vehicle with one or more chassis-mounted tanks or chassis-mounted containers, ~~((that do))~~ not to exceed 110 gallons (416 L) ~~((in))~~ capacity ~~((with))~~ for each tank or container and having an aggregate capacity ~~((that does not exceed))~~ not exceeding 800 gallons (3028 L) or the weight capacity of the vehicle in accordance with DOTn.
3. ~~((Tier))~~ Type 3 mobile fueling vehicle. A vehicle that carries a maximum aggregate capacity of 60 gallons (227 L) of motor fuel in metal safety cans listed in accordance with UL 30 or other *approved* metal containers, each not to exceed 5 gallons (19 L) in capacity.

**5707.2.2 Mobile fueling vehicle requirements.** Each mobile fueling vehicle shall comply with all local, state and federal requirements, ~~((as well as))~~ and the following:

1. Mobile fueling vehicles with a chassis-mounted tank in excess of 110 gallons (416 L) shall also comply with the requirements of Section 5706.6 and NFPA 385.
2. The mobile fueling vehicle and its equipment shall be maintained in good repair.
3. Safety cans and *approved* metal containers shall be secured to the mobile fueling vehicle except when in use.
4. Fueling a motor vehicle from tanks or containers mounted in a trailer connected to a mobile fueling vehicle shall be prohibited.

[W] **5707.3 Required documents.** Documents developed to comply with Sections 5707.3.1 through 5707.3.3 shall be updated as necessary by the *owner* of the mobile fueling operation and shall be maintained in compliance with Section 109.3.

**5707.3.1 Safety and emergency response plan.** Mobile fueling operators shall have an *approved* written safety and emergency response plan that establishes policies and procedures for fire safety, spill prevention and control, personnel training and compliance with other applicable requirements of this code. The safety and emergency response plan shall specifically address and require that all operators assess surroundings prior to fueling to consider the presence of items listed in Section 5707.3.3.

**5707.3.2 Training records.** Mobile fueling vehicles shall be operated only by designated personnel who are trained on proper fueling procedures and the safety and emergency response plan. Training records of operators shall be maintained.

**5707.3.3 Site plan.** Where required by the *fire code official*, a site plan shall be developed for each location or area at which mobile fueling occurs. The site plan shall be in sufficient detail to indicate but not be limited to the following:

1. All buildings, ~~((and))~~ structures.
2. *Lot lines* or property lines.
3. Electric car chargers.
4. Solar photovoltaic parking lot canopies.
5. Appurtenances on-site and their use or function.
6. All uses adjacent to the *lot lines* of the site.
7. Fueling locations.
8. Locations of all storm drain openings and adjacent waterways or wetlands.
9. Information regarding slope, natural drainage, curbing and impounding.
10. How a spill will be kept on the site property.
11. Scale of the site plan.

**5707.3.4 Tiered sites.** Where a site permitting process is required by the local jurisdiction, a site shall be designated by the *fire code official* to be one of the following and based on local provisions as necessitated by zoning laws, environmental laws, public safety, and other characteristics.

**5707.3.4.1 Tier 1 sites.** Sites that do not present atypical geographic, safety or environmental concerns shall be provided expedited permitting review and shall allow *permit* issuance prior to site inspection. The *fire code official* may impose additional conditions and may perform a site inspection during the period of *permit* validity.

**5707.3.4.2 Tier 2 sites.** Sites that require an inspection shall be *approved* by the *fire code official* prior to *permit* issuance.

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**[W] 5707.4 Mobile fueling areas.** During fueling, the mobile fueling vehicle and point of connection to the vehicle being fueled shall not be located on public streets, *public ways* or inside *buildings*. Fueling on the roof level of parking structures or other *buildings* is prohibited.

**5707.4.1 Separation.** During fueling, the point of connection to the vehicle being fueled shall not take place within 25 feet (7620 mm) of buildings, *lot lines*, property lines or combustible storage. Mobile fueling vehicles shall not park within 10 feet (3048 mm) of buildings, *lot lines*, property lines or combustible storage.

### Exceptions:

1. The *fire code official* shall be authorized to decrease the separation distance for dispensing from metal safety cans or other *approved* metal containers in accordance with Section 5707.2.
2. The point of fueling shall not take place within 10 feet (3048 mm) of buildings, *lot lines*, property lines or combustible storage where the mobile fueling vehicle has an *approved* vapor recovery system or is servicing vehicles with onboard refueling vapor recovery.

Where dispensing operations occur within 15 feet (4572 mm) of a storm drain, an *approved* storm drain cover or an *approved* equivalent method that will prevent any fuel from reaching the drain shall be used.

**5707.4.2 Sources of ignition.** Smoking, open flames and other sources of ignition shall be prohibited within 25 feet (7620 mm) of fuel dispensing activities. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of fueling shall be prominently posted on the mobile fueling vehicle. The engines of vehicles being fueled shall be shut off during fueling.

**5707.4.3 Electrical equipment.** Mobile fueling shall not occur within 20 feet (6096 mm) of electrical equipment located within 18 inches (457 mm) of the ground unless such electrical equipment is rated for Class I, Division 2, hazardous locations in accordance with NFPA 70.

**[W] 5707.5 Equipment.** Mobile fueling equipment shall comply with Sections 5707.5.1 through 5707.5.5.

**5707.5.1 Dispensing hoses and nozzles.** Where equipped, the dispensing hose shall not exceed 50 feet (15 240 mm) in length. The dispensing nozzles and hoses shall be of an *approved* and *listed* type. Where metal-to-metal contact cannot be made between the nozzle and the fuel fill opening, then a means for bonding the mobile fueling vehicle to the motor vehicle shall be provided and employed during fueling operations.

**5707.5.2 Breakaway device.** A *listed* breakaway device shall be provided at the nozzle.

**Exception:** Mobile fueling vehicles equipped with an *approved* brake interlock tied to the nozzle holder that prohibits movement of the mobile fueling vehicle when the nozzle is removed from its holder or tied to the delivery of fuel that prevents activation of the pumping system.

**5707.5.3 Shutoff valve and fuel limit.** Mobile fueling vehicles shall be equipped with a *listed* shutoff valve assembly and a fuel limit switch set to a maximum of 30 gallons (116 L).

**5707.5.4 Fire extinguisher.** An *approved* portable fire extinguisher complying with Section 906 with a minimum rating of 4-A:80-B:C shall be provided on the mobile fueling vehicle with signage clearly indicating its location.

**5707.5.5 Spill kit.** Mobile fueling vehicles shall contain a minimum 5-gallon (19 L) spill kit of an *approved* type.

**[W] 5707.6 Operations.** Mobile fueling vehicles shall be constantly attended during fueling operations with brakes set and warning lights in operation. Mobile fueling vehicles shall not obstruct emergency vehicle access roads.

**5707.6.1 Dispensing hose.** Where equipped, mobile fueling vehicles shall be positioned in a manner to preclude traffic from driving over the dispensing hose. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the mobile fueling vehicle.

**5707.6.2 Drip control.** Operators shall place a drip pan or an absorbent pillow under the nozzle and each fuel fill opening prior to and during dispensing operations to catch drips.

**5707.6.3 Safety cones.** Safety cones or other visual barriers shall be employed as warning devices to highlight the vehicle fueling area. Signs prohibiting smoking or open flames within 25 feet (7620 mm) shall be prominently posted in the vehicle fueling area.

**5707.6.4 Vehicle lights.** The mobile fueling vehicle flasher lights shall be in operation while dispensing operations are in progress.

**5707.6.5 Nighttime deliveries.** Nighttime deliveries shall be made only in areas (~~deemed adequately lighted by the fire code official~~) adequately lighted per WAC 296-800-21005.

**5707.6.6 Spill reporting.** Spills shall be reported in accordance with Section 5003.3.1.



## SECTION 5805 USE

**5805.1 General.** The use of flammable gases in amounts exceeding the *maximum allowable quantity per control area* indicated in Table 5003.1.1(1) or Table 5003.1.1(3) shall be in accordance with Sections 5001, 5003 and 5005, and this chapter.

## SECTION 5806 FLAMMABLE CRYOGENIC FLUIDS

**5806.1 General.** The storage and use of flammable *cryogenic fluids* shall be in accordance with Sections 5806.2 through 5806.4.8.3 and Chapter 55.

**[S] 5806.2 Limitations.** Storage of flammable *cryogenic fluids* in stationary containers outside of buildings is ~~((prohibited within the limits established by law as the limits of districts in which such storage is prohibited~~ **JURISDICTION TO SPECIFY** ~~))~~ only allowed to be located outside the *Fire District* in industrial zones as defined in the *Seattle Land Use Code*.

**5806.3 Above-ground tanks for liquid hydrogen.** Above-ground tanks for the storage of liquid hydrogen shall be in accordance with Sections 5806.3.1 through 5806.3.2.1.

**5806.3.1 Construction of the inner vessel.** The inner vessel of storage tanks in liquid hydrogen service shall be designed and constructed in accordance with Section VIII, Division 1, of the *ASME Boiler and Pressure Vessel Code* and shall be vacuum jacketed in accordance with Section 5806.3.2.

**5806.3.2 Construction of the vacuum jacket (outer vessel).** The vacuum jacket used as an outer vessel for storage tanks in liquid hydrogen service shall be of welded steel construction designed to withstand the maximum internal and external pressure to which it will be subjected under operating conditions to include conditions of emergency pressure relief of the annular space between the inner and outer vessel. The jacket shall be designed to withstand a minimum collapsing pressure differential of 30 psi (207 kPa).

**5806.3.2.1 Vacuum-level monitoring.** A connection shall be provided on the exterior of the vacuum jacket to allow measurement of the pressure within the annular space between the inner and outer vessel. The connection shall be fitted with a bellows-sealed or diaphragm-type valve equipped with a vacuum gauge tube that is shielded to protect against damage from impact.

**5806.4 Underground tanks for liquid hydrogen.** Underground tanks for the storage of liquid hydrogen shall be in accordance with Sections 5806.4.1 through 5806.4.8.3.

**5806.4.1 Construction.** Storage tanks for liquid hydrogen shall be designed and constructed in accordance with *ASME Boiler and Pressure Vessel Code* (Section VIII, Division 1) and shall be vacuum jacketed in accordance with Section 5806.4.8.

**5806.4.2 Location.** Storage tanks shall be located outside in accordance with the following:

1. Tanks and associated equipment shall be located with respect to foundations and supports of other structures such that the loads carried by the latter cannot be transmitted to the tank.
2. The distance from any part of the tank to the nearest wall of a *basement*, pit, cellar or *lot line* shall be not less than 3 feet (914 mm).
3. A minimum distance of 1 foot (305 mm), shell to shell, shall be maintained between underground tanks.

**5806.4.3 Depth, cover and fill.** The tank shall be buried such that the top of the vacuum jacket is covered with not less than 1 foot (305 mm) of earth and with concrete not less than 4 inches (102 mm) thick placed over the earthen cover. The concrete shall extend not less than 1 foot (305 mm) horizontally beyond the footprint of the tank in all directions. Underground tanks shall be set on firm foundations constructed in accordance with the *International Building Code* and surrounded with not less than 6 inches (152 mm) of noncorrosive inert material, such as sand.

**Exception:** The vertical extension of the vacuum jacket as required for service connections.

**5806.4.4 Anchorage and security.** Tanks and systems shall be secured against accidental dislodgement in accordance with this chapter.

**5806.4.5 Venting of underground tanks.** Vent pipes for underground storage tanks shall be in accordance with Section 5503.3.

**5806.4.6 Underground liquid hydrogen piping.** Underground liquid hydrogen piping shall be vacuum jacketed or protected by *approved* means and designed in accordance with Chapter 55.

**5806.4.7 Overfill protection and prevention systems.** An *approved* means or method shall be provided to prevent the overfill of all storage tanks.

## CHAPTER 61

# LIQUEFIED PETROLEUM GASES

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**User note:**

**About this chapter:** Chapter 61 provides requirements for the safe handling, storing and use of LP-gas to reduce the possibility of damage to containers, accidental releases of LP-gas, and exposure of flammable concentrations of LP-gas to ignition sources. LP-gas (notably propane) is well-known as a camping fuel for cooking, lighting, heating and refrigerating and also remains a popular standby fuel supply for auxiliary generators, as well as being widely used as an alternative motor vehicle fuel. Its characteristic as a clean-burning fuel has resulted in the addition of propane dispensers to service stations throughout the country. Dispensing LP-gas into motor vehicles is addressed by Chapter 23.

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### SECTION 6101 GENERAL

[S] **6101.1 Scope.** Storage, handling and transportation of liquefied petroleum gas (LP-gas) and the installation of LP-gas equipment pertinent to systems for such uses shall comply with this chapter, NFPA 54, and NFPA 58. Properties of LP-gases shall be determined in accordance with Appendix B of NFPA 58.

**6101.2 Permits.** Permits shall be required as set forth in Sections 105.5 and 105.6.

Distributors shall not fill an LP-gas container for which a permit is required unless a permit for installation has been issued for that location by the *fire code official*.

**6101.3 Construction documents.** Where a single LP-gas container is more than 2,000 gallons (7570 L) in water capacity or the aggregate water capacity of LP-gas containers is more than 4,000 gallons (15 140 L), the installer shall submit *construction documents* for such installation.

### SECTION 6102 DEFINITIONS

**6102.1 Definitions.** The following terms are defined in Chapter 2:

**LIQUEFIED PETROLEUM GAS (LP-gas).**

**LP-GAS CONTAINER.**

### SECTION 6103 INSTALLATION OF EQUIPMENT

[S] **6103.1 General.** LP-gas equipment shall be installed in accordance with (~~the *International Fuel Gas Code*~~) NFPA 54 and NFPA 58, except as otherwise provided in this chapter.

**6103.2 Use of LP-gas containers in buildings.** The use of LP-gas containers in buildings shall be in accordance with Sections 6103.2.1 through 6103.2.2.

**6103.2.1 Portable containers.** Portable LP-gas containers, as defined in NFPA 58, shall not be used in buildings except as specified in NFPA 58 and Sections 6103.2.1.1 through 6103.2.1.7.

**6103.2.1.1 Use in basement, pit or similar location.** LP-gas containers shall not be used in a *basement*, pit, above-grade underfloor space or similar location where heavier-than-air gas might collect unless such location is provided with an *approved* means of ventilation.

**Exception:** Use with self-contained torch assemblies in accordance with Section 6103.2.1.6.

[S] **6103.2.1.2 Construction and temporary heating.** Portable LP-gas containers are allowed to be used in buildings or areas of buildings undergoing construction as set forth in Section 3305 ((~~or~~)) for temporary heating and food service appliances in buildings in emergencies as set forth in (~~Sections 6.22.4, 6.22.5 and~~) Section 6.22.8 of NFPA 58.

**6103.2.1.3 Group F occupancies.** In Group F occupancies, portable LP-gas containers are allowed to be used to supply quantities necessary for processing, research or experimentation. Where manifolded, the aggregate water capacity of such containers shall not exceed 735 pounds (334 kg) per manifold. Where multiple manifolds of such containers are present in the same room, each manifold shall be separated from other manifolds by a distance of not less than 20 feet (6096 mm).

## LIQUEFIED PETROLEUM GASES

[S] **6103.2.1.4 Research and experimentation.** In Group I occupancies and laboratories for educational use in Group B and E occupancies, portable LP-gas containers are allowed to be used for research and experimentation. Such containers shall not be used in classrooms. Such containers shall not exceed a 50-pound (23 kg) water capacity in occupancies used for research or educational purposes and shall not exceed a 12-pound (5 kg) water capacity in occupancies used for institutional purposes. Where more than one such container is present in the same room, each container shall be separated from other containers by a distance of not less than 20 feet (6096 mm).

**6103.2.1.5 Demonstration uses.** Portable LP-gas containers are allowed to be used temporarily for demonstrations and public exhibitions. Such containers shall not exceed a water capacity of 12 pounds (5 kg). Where more than one such container is present in the same room, each container shall be separated from other containers by a distance of not less than 20 feet (6096 mm).

**6103.2.1.6 Use with self-contained torch assemblies.** Portable LP-gas containers are allowed to be used to supply *approved* self-contained torch assemblies or similar appliances. Such containers shall not exceed a water capacity of 2.7 pounds (1.2 kg).

[S] **6103.2.1.7 Use for food preparation.** Where *approved, listed* LP-gas commercial food service appliances are allowed to be used for food-preparation within restaurants and in attended commercial food-catering operations in accordance with ~~((the *International Fuel Gas Code*))~~ NFPA 54, the *International Mechanical Code* and NFPA 58.

[S] 6103.2.1.8 Use on roofs and exterior balconies. A single LP-gas container having an individual capacity not exceeding 48 pounds (nominal 20 pound LP-gas) connected to a grill is allowed on a roof and on each exterior balcony of a building. In addition, LP-gas containers are permitted on roofs when connected to portable outdoor gas-fired heating appliances in accordance with Section 605.5.2.

**6103.2.2 Industrial vehicles and floor maintenance machines.** LP-gas containers on industrial vehicles and floor maintenance machines shall comply with Sections 11.11 and 11.12 of NFPA 58.

[S] **6103.3 Location of equipment and piping.** Equipment and piping shall not be installed in locations where such equipment and piping is prohibited by ~~((the *International Fuel Gas Code*))~~ NFPA 54.

## SECTION 6104 LOCATION OF LP-GAS CONTAINERS

**6104.1 General.** The storage and handling of LP-gas and the installation and maintenance of related equipment shall comply with NFPA 58 and be subject to the approval of the *fire code official*, except as provided in this chapter.

[S] **6104.2 ~~((Maximum capacity within established limits))~~ Fire District restrictions.** ~~((Within the limits established by law restricting the storage of liquefied petroleum gas for the protection of heavily populated or congested areas, the aggregate capacity of any one installation shall not exceed a water capacity of 2,000 gallons (7570 L) ~~[JURISDICTION TO SPECIFY].~~))~~ Storage and use of LP-gas containers having an individual capacity in excess of 239 pounds (108.4 kg) water capacity [nominal 100 pounds (48.3 kg) LP-gas] and all stationary installations are prohibited in the *Fire District*.

**Exception:** ~~((In particular installations, this capacity limit shall be determined by the *fire code official*, after consideration of special features such as topographical conditions, nature of occupancy, and proximity to buildings, capacity of proposed LP-gas containers, degree of fire protection to be provided and capabilities of the local fire department.))~~ Containers and stationary installations up to 500 gallons (1892 L) LP-gas capacity west of Alaskan Way.

[S] **6104.3 Container location.** LP-gas containers shall be located with respect to buildings and *lot lines* of adjoining property that can be built on, in accordance with Table 6104.3.

**Exception:** LP-gas containers not exceeding 48 pounds (nominal 20 pound LP-gas) connected to equipment or portable heaters are allowed to be located on public ways if located a minimum of 5 feet (1524 mm) from buildings.

## LIQUEFIED PETROLEUM GASES

3. Protected by *fire walls* of *approved* construction.
4. Protected by an *approved* system for application of water as specified in Table 6.5.1.2 of NFPA 58.
5. Protected by other *approved* means.

Where one of these forms of protection is provided, the separation shall be not less than 25 feet (7620 mm) between LP-gas container groups.

### SECTION 6105 PROHIBITED USE OF LP-GAS

**6105.1 Nonapproved equipment.** LP-gas shall not be used for the purpose of operating devices or equipment unless such device or equipment is *approved* for use with LP-gas.

**6105.2 Release to the atmosphere.** LP-gas shall not be released to the atmosphere, except in accordance with Section 7.3 of NFPA 58.

### SECTION 6106 DISPENSING AND OVERFILLING

**6106.1 Attendants.** Dispensing of LP-gas shall be performed by a qualified attendant.

**6106.2 Overfilling.** LP-gas containers shall not be filled or maintained with LP-gas in excess of either the volume determined using the fixed liquid-level gauge installed in accordance with the manufacturer's specifications and in accordance with Section 5.9.5 of NFPA 58 or the weight determined by the required percentage of the water capacity marked on the container. Portable LP-gas containers shall not be refilled unless equipped with an overfilling prevention device (OPD) where required by Section 5.9.3 of NFPA 58.

**6106.3 Dispensing locations.** The point of transfer of LP-gas from one LP-gas container to another shall be separated from exposures as specified in NFPA 58.

### SECTION 6107 SAFETY PRECAUTIONS AND DEVICES

**6107.1 Safety devices.** Safety devices on LP-gas containers, equipment and systems shall not be tampered with or made ineffective.

**6107.2 Smoking and other sources of ignition.** "No Smoking" signs complying with Section 310 shall be posted where required by the *fire code official*. Smoking within 25 feet (7620 mm) of a point of transfer, while filling operations are in progress at LP-gas containers or vehicles, shall be prohibited.

Control of other sources of ignition shall comply with Chapter 3 of this code and Section 6.25 of NFPA 58.

**6107.3 Clearance to combustibles.** Weeds, grass, brush, trash and other combustible materials shall be kept not less than 10 feet (3048 mm) from LP-gas tanks or containers.

**6107.4 Protecting containers from vehicles.** Where exposed to vehicular damage due to proximity to alleys, driveways or parking areas, LP-gas containers, regulators and piping shall be protected in accordance with NFPA 58.

### SECTION 6108 FIRE PROTECTION

**[W] 6108.1 General.** (~~Fire protection shall be provided for installations having LP-gas storage containers with a water capacity of more than 4,000 gallons (15 140 L), as required by Section 6.29 of NFPA 58.~~) Storage, handling and transportation of liquefied petroleum gas (LP-gas) and the installation of LP-gas equipment pertinent to systems for such uses shall comply with this chapter and NFPA 58. Properties of LP-gas shall be determined in accordance with Appendix B of NFPA 58.

**Exception:** The use and storage of listed propane fired barbecue grills on R-2 decks and balconies with an *approved* container not exceeding a water capacity of 20 pounds (9 kg) that maintain a minimum clearance of 18 inches (457 mm) on all sides, unless listed for lesser clearances.

**6108.2 Portable fire extinguishers.** Portable fire extinguishers complying with Section 906 shall be provided as specified in NFPA 58.

## SECTION 6109 STORAGE OF PORTABLE LP-GAS CONTAINERS AWAITING USE OR RESALE

**6109.1 General.** Storage of portable LP-gas containers of 1,000 pounds (454 kg) or less, whether filled, partially filled or empty, at consumer sites or distribution points, and for resale by dealers or resellers shall comply with Sections 6109.2 through 6109.15.1.

### Exceptions:

1. LP-gas containers that have not previously been in LP-gas service.
2. LP-gas containers at distribution plants.
3. LP-gas containers at consumer sites or distribution points, which are connected for use.

**6109.2 Exposure hazards.** LP-gas containers in storage shall be located in a manner that minimizes exposure to excessive temperature rise, physical damage or tampering.

**6109.3 Position.** LP-gas containers in storage having individual water capacity greater than 2.7 pounds (1.2 kg) [nominal 1-pound (0.454 kg) LP-gas capacity] shall be positioned with the pressure relief valve in direct communication with the vapor space of the container.

**6109.4 Separation from means of egress.** LP-gas containers stored in buildings in accordance with Sections 6109.9 and 6109.11 shall not be located near *exit access* doors, *exits*, *stairways* or in areas normally used, or intended to be used, as a *means of egress*.

**6109.5 Quantity.** Empty LP-gas containers that have been in LP-gas service shall be considered as full containers for the purpose of determining the maximum quantities of LP-gas allowed in Sections 6109.9 and 6109.11.

**6109.6 Storage on roofs.** LP-gas containers that are not connected for use shall not be stored on roofs.

**6109.7 Storage in basement, pit or similar location.** LP-gas containers shall not be stored in a *basement*, pit or similar location where heavier-than-air gas might collect. LP-gas containers shall not be stored in above-grade underfloor spaces or *basements* unless such location is provided with an *approved* means of ventilation.

**Exception:** Department of Transportation (DOTn) specification cylinders with a maximum water capacity of 2.7 pounds (1.2 kg) for use in completely self-contained hand torches and similar applications. The quantity of LP-gas shall not exceed 20 pounds (9 kg).

**6109.8 Protection of valves on LP-gas containers in storage.** LP-gas DOTn cylinder valves shall be protected by screw-on-type caps or collars that shall be securely in place on all containers stored regardless of whether they are full, partially full or empty. Container and tank outlet valves shall be closed or plugged.

**[S] 6109.9 Storage within buildings open to the public.** Department of Transportation (DOTn) specification cylinders with maximum water capacity of 2.7 pounds (1.2 kg) used in completely self-contained hand torches and similar applications are allowed to be stored or displayed in a building open to the public. The quantity of LP-gas shall not exceed 25 pounds (11.4 kg) within the Fire District and 200 pounds (91 kg) elsewhere except as provided in Section 6109.11.

**[S] 6109.10 Storage within buildings not open to the public.** The maximum quantity allowed in one storage location in buildings not open to the public, such as industrial buildings, shall not exceed a water capacity of 72 pounds water capacity (nominal 30 pounds LP-gas) within the Fire District and 735 pounds (334 kg) [nominal 300 pounds (136 kg) of LP-gas] elsewhere. Where additional storage locations are required on the same floor within the same building, they shall be separated by not less than 300 feet (91 440 mm). Storage beyond these limitations shall comply with Section 6109.11.

**6109.10.1 Quantities on equipment and vehicles.** LP-gas containers carried as part of service equipment on highway mobile vehicles need not be considered in the total storage capacity in Section 6109.10, provided that such vehicles are stored in private garages and do not carry more than three LP-gas containers with a total aggregate LP-gas capacity not exceeding 100 pounds (45.4 kg) per vehicle. LP-gas container valves shall be closed.

**6109.11 Storage within rooms used for gas manufacturing.** Storage within buildings or rooms used for gas manufacturing, gas storage, gas-air mixing and vaporization, and compressors not associated with liquid transfer shall comply with Sections 6109.11.1 and 6109.11.2.

**6109.11.1 Quantity limits.** The maximum quantity of LP-gas shall be 10,000 pounds (4540 kg).

**6109.11.2 Construction.** The construction of such buildings and rooms shall comply with requirements for Group H occupancies in the *International Building Code*, Chapter 10 of NFPA 58 and both of the following:

1. Adequate vents shall be provided to the outside at both top and bottom, located not less than 5 feet (1524 mm) from building openings.
2. The entire area shall be classified for the purposes of ignition source control in accordance with Section 6.25 of NFPA 58.

**TABLE 6204.1.7  
STORAGE OF ORGANIC PEROXIDES**

ORGANIC PEROXIDE CLASS	PILE CONFIGURATION				MAXIMUM QUANTITY PER BUILDING
	Maximum width (feet)	Maximum height (feet)	Minimum distance to next pile (feet)	Minimum distance to walls (feet)	
I	6	8	4 <sup>a</sup>	4 <sup>b</sup>	Note c
II	10	8	4 <sup>a</sup>	4 <sup>b</sup>	Note c
III	10	8	4 <sup>a</sup>	4 <sup>b</sup>	Note c
IV	16	10	3 <sup>a, d</sup>	4 <sup>b</sup>	No Requirement
V	No Requirement	No Requirement	No Requirement	No Requirement	No Requirement

For SI: 1 foot = 304.8 mm.

- a. Not less than one main aisle with a minimum width of 8 feet shall divide the storage area.
- b. Distance to noncombustible walls is allowed to be reduced to 2 feet.
- c. See Table 6204.1.2 for maximum quantities.
- d. The distance shall be not less than one-half the pile height.

**6204.1.8 Location in building.** The storage of Class I or II organic peroxides shall be on the ground floor. Class III organic peroxides shall not be stored in *basements*.

**6204.1.9 Contamination.** Organic peroxides shall be stored in their original DOTn shipping containers. Organic peroxides shall be stored in a manner to prevent contamination.

**6204.1.10 Explosion control.** Indoor storage rooms, areas and buildings containing unclassified detonable and Class I organic peroxides shall be provided with explosion control in accordance with Section 911.

**6204.1.11 Standby power.** Standby power shall be provided in accordance with Section 1203 for the following systems used to protect Class I and unclassified detonable organic peroxides:

1. Exhaust ventilation system.
2. Treatment system.
3. Smoke detection system.
4. Temperature control system.
5. Fire alarm system.
6. Emergency alarm system.

**6204.1.11.1 Fail-safe engineered systems.** ~~((Standby))~~ *Legally required standby* power shall not be required for mechanical exhaust ventilation, treatment systems and temperature control systems where *approved* fail-safe engineered systems are installed.

**6204.2 Outdoor storage.** Outdoor storage of organic peroxides in amounts exceeding the *maximum allowable quantities per control area* indicated in Table 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5004 and this chapter.

**6204.2.1 Distance from storage to exposures.** Outdoor storage areas for organic peroxides shall be located in accordance with Table 6204.1.2.

**6204.2.2 Electrical wiring and equipment.** In addition to the requirements of Section 5003.9.4, electrical wiring and equipment in outdoor storage areas containing unclassified detonable, Class I or Class II organic peroxides shall comply with the requirements for electrical Class I, Division 2, locations.

**6204.2.3 Maximum quantities.** Maximum quantities of organic peroxides in outdoor storage shall be in accordance with Table 6204.1.2.

**6204.2.4 Storage arrangement.** Storage arrangements shall be in accordance with Table 6204.1.7.

**6204.2.5 Separation.** In addition to the requirements of Section 5003.9.8, outdoor storage areas for organic peroxides in amounts exceeding those specified in Table 5003.8.2 shall be located a minimum distance of 50 feet (15 240 mm) from other hazardous material storage.

## SECTION 6205 USE

**6205.1 General.** The use of organic peroxides in amounts exceeding the *maximum allowable quantity per control area* indicated in Table 5003.1.1(1) or 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5005 and this chapter.

**ICC—continued**

**[W] IMC—21: International Mechanical Code®**

201.3, 308.3, 605.1, 605.2.1.1, 605.2.1.2, 605.2.1.3, 605.2.1.4, 605.2.1.5, 605.3, 605.4, 605.4.2.3, 605.4.2.5, 605.6.2, 605.8, 606.1, 606.2, 608.1, 608.3, 608.4, 608.5, 608.8, 608.9.1, 608.10, 608.17, 610.1.1, 903.2.11.4, 904.13, 907.3.1, 909.1, 909.10.2, 909.13.1, 910.4.7, 915.6.1, 1006.2.2.3, 1011.16, 1020.6.1, 1207.4.7, 1207.6.1, 1207.6.1.2.2, 1207.11.7, 2104.2.1, 2105.3, 2301.1, 2301.6, 2309.3.1.2, 2311.3.1, 2311.4.3, 2311.8.2, 2311.8.8, 2311.8.10, 2404.7, 2404.7.2, 2504.5, 2703.2.2, 2703.10.4, 2703.14, 2803.2, 2803.3, 3001.1, 3003.1, 3004.2, 3107.12.1, 3107.12.2, 3703.5, 3804.1.1.7, 3903.2.2, 3903.3.3, 3904.1, Table 5003.1.1(1), 5003.8.4.2, 5003.8.5.2, 5003.8.6.2, 5004.3.1, 5303.7.6, 5303.16.9, 5305.5, 5306.2.2, 5306.2.3, 5307.4.4, 5504.2.1.3, 5504.2.2.3, 5505.4.1.1, 5701.3, 5703.6.1, 5704.2.8.9, 5705.3.7.5.1, 5706.2, 5706.4.4, 6003.1.3, 6003.2.3.2, 6004.2.2.7, 6005.3.1, 6005.3.2, 6103.2.1.7

**IPC—21: International Plumbing Code®**

201.3, 903.3.5, 904.11.1.3, 912.6, 2311.2.3, 5004.2.2.6

**IPMC—21: International Property Maintenance Code®**

311.1.1

**IRC—21: International Residential Code®**

102.5, 202, 913.1, 1001.1, 1205.1, 1205.2.1

**IWUIC—21: International Wildland-Urban Interface Code®**

304.1.2

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## IIAR

International Institute of Ammonia Refrigeration  
1001 N. Fairfax Street, Suite 503  
Alexandria, VA 22314

**ANSI/IIAR 2—2014, including Addendum A: Safe Design of Closed-circuit Ammonia Refrigeration Systems**

608.1.2, 608.9

**ANSI/IIAR 6—2019: Standard for Inspection, Testing, and Maintenance of Closed-circuit Ammonia Refrigeration Systems**

608.1.2

**ANSI/IIAR 7—2019: Developing Operating Procedures for Closed-circuit Ammonia Refrigeration Systems**

608.1.2

**ANSI/IIAR 8—2020: Decommissioning of Closed-circuit Ammonia Refrigeration Systems**

608.1.2

**ANSI/IIAR 9—2020: Standard for Minimum System Safety Requirements for Existing Closed-circuit Ammonia Refrigeration Systems**

608.1.2

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## IKECA

International Kitchen Exhaust Cleaning Association  
100 North 20th Street, Suite 400  
Philadelphia, PA 19103

**ANSI/IKECA C10—2016: Standard for the Methodology for Cleaning Commercial Kitchen Exhaust Systems**

606.3.3.2

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## ISO

International Organization for Standardization (ISO)  
ISO Central Secretariat 1 ch, de la Voie-Creuse, Case postale 56  
CH-1211 Geneva 20, Switzerland

**ISO 8115—86: Cotton Bales—Dimensions and Density**

Table 2704.2.2.1, Table 5003.1.1(1)

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## NEMA

National Electrical Manufacturer's Association  
1300 North 17th Street Suite 900  
Arlington, VA 22209

**250—2018: Enclosures for Electrical Equipment (1,000 Volt Maximum)**

6005.2

REFERENCED STANDARDS

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# NFPA

National Fire Protection Association  
1 Batterymarch Park  
Quincy, MA 02169-7471

**02—20: Hydrogen Technologies Code**

1206.3, 1206.4, 2309.1, 2309.3.1.1, 2309.3.1.2, 2309.4, 2309.6, 2311.8, 2311.8.2, 2311.8.10, 2311.8.11, 5301.1, 5801.1

**04—21: Standard for Integrated Fire Protection and Life Safety System Testing**

901.6.2.1, 901.6.2.2

**10—18: Standard for Portable Fire Extinguishers**

Table 901.6.1, 906.2, Table 906.3(1), Table 906.3(2), 906.3.2, 906.3.4, 3006.3

**11—16: Standard for Low-, Medium-, and High-expansion Foam**

904.7, 5704.2.9.2.2

**12—18: Standard on Carbon Dioxide Extinguishing Systems**

Table 901.6.1, 904.8, 904.13, 1207.5.5

**12A—18: Standard on Halon 1301 Fire Extinguishing Systems**

Table 901.6.1, 904.9

**[W] 13—19: Standard for the Installation of Sprinkler Systems (except 9.3.6.3(5))**

903.3.1.1, 903.3.2, 903.3.8.2, 903.3.8.5, 904.13, 905.3.4, 907.6.4, 914.3.2, 1019.3, 1019.3, 1103.4.8, 3201.1, 3204.2, 3205.5, Table 3206.2, 3206.4.1, 3206.10, 3207.2, 3207.2.1, 3208.2.2, 3208.2.2.1, 3208.4, 3210.1, 3401.1, 5104.1, 5104.1.1, 5106.5.7, 5704.3.3.9, Table 5704.3.6.3(7), 5704.3.7.5.1, 5704.3.8.4

**13D—19: Standard for the Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes**

903.3.1.3

**13R—19: Standard for the Installation of Sprinkler Systems in Low-rise Residential Occupancies**

903.3.1.2, 903.3.5.2, 903.4

**14—19: Standard for the Installation of Standpipe and Hose Systems**

905.2, 905.3.4, 905.4.2, 905.6.2, 905.8

**15—17: Standard for Water Spray Fixed Systems for Fire Protection**

1207.5.5, 5704.2.9.2.3

**16—19: Standard for the Installation of Foam-water Sprinkler and Foam-water Spray Systems**

904.7, 904.13

**17—21: Standard for Dry Chemical Extinguishing Systems**

Table 901.6.1, 904.6, 904.13

**17A—21: Standard for Wet Chemical Extinguishing Systems**

Table 901.6.1, 904.5, 904.13

**20—19: Standard for the Installation of Stationary Pumps for Fire Protection**

913.1, 913.2, 913.5.1

**22—18: Standard for Water Tanks for Private Fire Protection**

507.2.2

**24—19: Standard for Installation of Private Fire Service Mains and Their Appurtenances**

507.2.1, 2809.5

**25—20: Standard for the Inspection, Testing and Maintenance of Water-based Fire Protection Systems**

507.5.3, Table 901.6.1, 901.7, 904.7.1, 912.7, 913.5

**30—21: Flammable and Combustible Liquids Code**

607.1, 5001.1, 5701.2, 5703.6.2, 5703.6.2.1, 5704.2.7, 5704.2.7.1, 5704.2.7.2, 5704.2.7.3.2, 5704.2.7.4, 5704.2.7.6, 5704.2.7.7, 5704.2.7.8, 5704.2.7.9, 5704.2.9.3, 5704.2.9.4, 5704.2.9.6.1.1, 5704.2.9.6.1.2, 5704.2.9.6.1.3, 5704.2.9.6.1.4, 5704.2.9.6.1.5, 5704.2.9.6.2, 5704.2.9.7.3, 5704.2.10.2, 5704.2.11.3, 5704.2.11.4.2, 5704.2.12.1, 5704.3.1, 5704.3.6, Table 5704.3.6.3(1), Table 5704.3.6.3(2), Table 5704.3.6.3(3), 5704.3.7.2.3, 5704.3.8.4, 5706.8.3

**30A—21: Code for Motor Fuel-dispensing Facilities and Repair Garages**

2301.4, 2301.5, 2301.6, 2306.6.3, 2310.1

**30B—19: Code for the Manufacture and Storage of Aerosol Products**

5101.1, 5103.1, 5104.1, Table 5104.3.1, Table 5104.3.2, Table 5104.3.2.2, 5104.3.3, 5104.4.1, 5104.5.2, 5104.6, 5104.8.2, 5106.2.2, 5106.2.4, 5106.3.2, Table 5106.4, 5106.5.1, 5106.5.6, 5107.1



**NFPA—continued**

- 31—20: Standard for the Installation of Oil-burning Equipment**  
605.1.6, 605.4.1, 605.4.3
- 32—16: Standard for Dry Cleaning Facilities**  
2107.1, 2107.3
- [W] 33—18: Standard for Spray Application Using Flammable or Combustible Materials**  
2403.3.3, 2404.3.5
- 34—18: Standard for Dipping, Coating and Printing Processes Using Flammable or Combustible Liquids**  
2405.3, 2405.4.1.1
- 35—16: Standard for the Manufacture of Organic Coatings**  
2901.3, 2905.4
- 40—19: Standard for the Storage and Handling of Cellulose Nitrate Film**  
306.2
- 45—19: Standard on Fire Protection for Laboratories Using Chemicals (2015 Edition)**  
3803.1.5, 3804.1.1.7, 3805.2.1, 3805.2.2
- 51—18: Design and Installation of Oxygen-fuel Gas Systems for Welding, Cutting and Allied Processes**  
3501.5, 3507.1, 3509.1
- 52—19: Vehicular Gaseous Fuel System Code**  
319.9.2, 5301.1
- [S] 54-21: National Fuel Gas Code**  
6101.1, 6103.1, 6103.2.1.7, 6103.3
- 55—20: Compressed Gases and Cryogenic Fluids Code**  
3508.1, 5301.1, 5307.4.2, 5501.1, 5801.1, 6301.1
- 56—20: Standard for Fire and Explosion Prevention during Cleaning and Purging of Flammable Gas Piping Systems**  
3307.2.1
- 58—20: Liquefied Petroleum Gas Code**  
319.8.3, 2311.5, 3903.6, 6101.1, 6103.1, 6103.2.1, 6103.2.1.2, 6103.2.1.7, 6103.2.2, 6104.1, 6104.3.2, 6104.4, 6105.2, 6106.2, 6106.3, 6107.2, 6107.4, 6108.1, 6108.2, 6109.11.2, 6111.3
- 59A—19: Standard for the Production, Storage and Handling of Liquefied Natural Gas (LNG)**  
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- 68—13: Standard on Explosion Protection by Deflagration Venting**  
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911.1, 911.3, Table 2205.1
- 70—20: National Electrical Code**  
309.2, 603.1, 603.1.1, 603.2.1, 603.4, 603.4.1, 603.5, 603.8, 605.1.2, 605.1.6, 605.6.2, 607.6, 607.7, 608.17, 608.18, 904.3.1, 907.6.1, 909.12.2, 909.16.3, 910.4.6, 1006.2.2.4, 1010.2.9.2, 1201.2, 1203.1.3, 1205.1, 1206.4, 1206.14, 1207.4.1, 1207.4.2, 1207.4.8, 1207.5.3, 1207.10.6, 1207.10.7.4, 1207.11.5, 1207.11.10, 2006.3.4, 2104.2.3, 2108.2, 2203.4.1, 2203.5, Table 2205.1, 2301.5, 2305.4, 2308.8.1.2.4, 2309.2.3, 2311.3.1, 2311.8.10, 2403.2.1, 2403.2.1.1, 2403.2.1.4, 2403.2.5, 2404.6.1.2.2, 2404.9.4, 2504.5, 2603.2.1, 2703.7.1, 2703.7.2, 2703.7.3, 2803.4, 2904.1, 3103.12.6.1, 3106.6, 3107.12.7, 3305.7, 3506.4, 4003.3.3, 4003.4, 5003.8.7.1, 5003.9.4, 5303.7.6, 5303.8, 5303.16.11, 5303.16.14, 5503.6, 5503.6.2, 5703.1, Table 5703.1.1, 5703.1.3, 5704.2.8.12, 5704.2.8.17, 5706.2.8, 5803.1.5, 5803.1.5.1, 5807.1.10, 5906.5.5, 5906.5.6, 6109.15.1
- 72—19: National Fire Alarm and Signaling Code**  
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- 76—16: Standard for the Fire Protection of Telecommunications Facilities**  
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705.2, 706.1, 1010.3.3, 1032.2.2
- 85—19: **Boiler and Combustion System Hazards Code**  
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- 92—18: **Standard for Smoke Control Systems**  
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- [W] 96—21: **Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations**  
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United States Code  
c/o Superintendent of Documents  
U.S. Government Printing Office  
Washington, DC 20402-9325

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202
- 21 USC Chapter 9: United States Food, Drug and Cosmetic Act**  
202

## CHAPTER 90

# RESIDENTIAL OCCUPANCIES FOUR STORIES AND OVER

**Note:** Chapter 90 is entirely Seattle amendments to the *International Fire Code* and is not underlined.

### Point of Information

The requirements of this chapter originated in City of Seattle Ordinance 98868, effective June 6, 1970. Ordinance 98868, also known as the Ozark ordinance, applied to all existing apartment houses, apartment hotels, and hotels four stories or more in height.

### SECTION 9001 GENERAL

**9001.1 Definitions.** For the purpose of this chapter, the following words and terms have the meaning specified in Section 9001.1:

**APARTMENT HOUSE:** Any building or portion thereof, containing three or more dwelling units.

**APARTMENT HOTEL:** A building containing both dwelling units and guest rooms.

**GUEST ROOM:** Any room or rooms used or intended to be used for sleeping purposes by a person hiring such room or rooms.

**HOTEL:** A building in which is conducted the business of lodging the public and which contains six or more guest rooms.

**9001.2 Exit Enclosure Required.** All existing apartment houses, apartment hotels and hotels four stories or more in height, shall have at least two fully enclosed stairways which have a one-hour fire-resistive rating throughout. The interior corridors and egressways thereof, including all doors, transoms and other openings into corridors, shall be constructed or improved to substantially have a one-hour fire-resistive rating throughout. In buildings constructed as apartment houses in accordance with the Building Code and being operated as apartment houses, walls and ceilings of plaster on wood lath or 1/2-inch (13 mm) plasterboard construction, and 1-3/8-inch (35 mm) solid core doors or equivalent shall be sufficient to meet the requirements of this section.

**9001.3 Sprinkler Alternative.** In lieu of compliance with the requirements of Section 9001.2, *approved* automatic fire sprinkler systems may be installed in all stairways, interior corridors and egressways of existing apartment houses, apartment hotels, and hotels four stories or more in height. Automatic sprinkler systems, if so installed, shall also be installed in all janitor rooms, storage closets, utility rooms, and other usable spaces in which combustible materials are or may be sorted or kept, unless such rooms or spaces are equipped with self-closing fire doors having a one-hour fire-resistive rating.

### SECTION 9002 CONFLICTS WITH LATER ADOPTED CODES

**9002.1. Conflicts with Seattle Building and Seattle Fire Codes adopted after June 6, 1970.** Where conflicts exist between the requirements of this chapter and Seattle Building Codes and Seattle Fire Codes adopted after June 6, 1970, the provisions of the later adopted codes apply.

## CHAPTER 91

# AUTOMATIC SPRINKLER SYSTEMS IN NURSING HOMES

**Note:** Chapter 91 is entirely Seattle amendments to the *International Fire Code* and is not underlined.

### Point of Information

The requirements of this chapter originated in City of Seattle Ordinance 94931, effective August 5, 1966.

### SECTION 9101 SCOPE

**9101.1 Nursing home defined.** For the purpose of this chapter, the term “nursing home” means any home, place, or institution which operates or maintains facilities providing convalescent or chronic care, or both, for a period in excess of 24 consecutive hours for three or more patients not related by blood or marriage to the operator, who by reason of illness or infirmity are unable properly to care for themselves. Convalescent and chronic care may include, but is not limited to, any or all procedures commonly employed in waiting on the sick such as administration of medicines, preparation of dressings and bandages, and carrying out of treatment prescribed by a duly licensed practitioner of the healing arts. It may also include care of mentally incompetent persons if they do not require psychiatric treatment by or under the supervision of a physician specialized in the field of medicine. Nothing in this definition shall be construed to include general hospitals or other places which provide care and treatment for the acutely ill and maintain and operate facilities for major surgery or obstetrics, or both. Nothing in this definition shall be construed to include any boarding home, guest home, hotel or related institution which is held forth to the public as providing, and which is operated to give, only board, room and laundry to persons not in need of medical or nursing treatment or supervision, except in the case of temporary acute illness. The mere designation by the operator of any place or institution, which does not provide care for the acutely ill or maintain and operate facilities for major surgery or obstetrics, as a hospital, sanitarium, or similar name shall not exclude such place or institution from the provisions of Section 9102.

### SECTION 9102 INSTALLATION OF EQUIPMENT

**9102.1 Installation exceptions.** *Approved* automatic fire sprinkler systems shall be installed in all usable rooms, corridors, and stairways of existing nursing homes with the following exceptions:

1. Nursing homes which are of Type I or II construction throughout, as defined in the Building Code.
2. Nursing homes not more than one story in height which have interiors with a one-hour fire resistance rating throughout.

### SECTION 9103 CONFLICTS WITH LATER ADOPTED CODES

**9103.1 Conflicts with Seattle Building and Seattle Fire Codes adopted after August 5, 1966.** Where conflicts exist between the requirements of this chapter and Seattle Building Codes and Seattle Fire Codes adopted after August 5, 1966, the provisions of the later adopted code shall apply providing they are not less stringent.



## CHAPTER 92

# AUTOMATIC SPRINKLER SYSTEMS IN SCHOOLS

**Note:** Chapter 92 is entirely Seattle amendments to the *International Fire Code* and is not underlined.

### Point of Information

The requirements of this chapter originated in City of Seattle Ordinance 94931, effective August 5, 1966.

### SECTION 9201 GENERAL

**9201.1 School buildings defined.** For the purpose of this chapter, the term “school building” means:

1. A public place of instruction operated by public authorities, including elementary and secondary schools.
2. A place of instruction operated by private persons or private or religious organizations in which the course of study is similar to that in a public school, and which has been authorized by the State as an educational institution.

### SECTION 9202 INSTALLATION OF EQUIPMENT

**9202.1 Installation exceptions.** An *approved* automatic fire sprinkler system shall be installed in all usable rooms, corridors and stairways of existing school buildings, two stories or more in height, with the following exceptions:

1. School buildings which are of Type I or II construction as defined in the Building Code.
2. School buildings not over three stories in height which have interiors with one-hour fire resistance rating throughout, and which have egress enclosures with a one-hour fire resistance rating.
3. School buildings, not over three stories in height, with interiors which substantially have a one-hour fire resistance rating, need only have egress corridors, stairways, janitor rooms, storage rooms and similar spaces equipped with *approved* automatic sprinkler systems. Classrooms and assembly rooms in such buildings need not be so equipped.

### SECTION 9203 CONFLICTS WITH LATER ADOPTED CODES

**9203.1 Conflicts with Seattle Building and Seattle Fire Codes adopted after August 5, 1966.** Where conflicts exist between the requirements of this chapter and Seattle Building Codes and Seattle Fire Codes adopted after August 5, 1966, the provisions of the later adopted code shall apply.

## CHAPTER 93

# MINIMUM STANDARDS FOR HIGH-RISE BUILDINGS

**Note:** Chapter 93 is entirely Seattle amendments to the *International Fire Code* and is not underlined.

### Chapter 93 Point of Information

The requirements of this chapter originated in City of Seattle Ordinance 110299, effective January 23, 1982. Where used in this chapter, the term “Building Code” shall mean the 1982 Seattle Building Code. Where used in this chapter, the terms “this Code” and “the fire code” shall mean the 1982 Seattle Fire Code.

### SECTION 9301 GENERAL

**9301.1 Purpose.** The main purpose of this chapter is to improve the fire and life safety of existing high-rise buildings that do not conform to current City codes so that the health, safety and welfare of the general public is provided for and promoted. It is recognized that the application of present day fire protection techniques to some existing high-rise buildings is difficult. For this reason, this chapter may permit the use of alternative methods and innovative approaches and techniques to achieve its purpose, if *approved* by the *fire code official* and the *building official*.

**9301.2 Scope.** This chapter applies to all high-rise buildings in existence at the time of its adoption, as well as to all high-rise buildings coming into existence after the adoption thereof.

**9301.2.1 Hazards and design features.** If the *fire code official* finds a condition in a high-rise building not specifically addressed in this chapter, which in the *fire code official's* opinion makes fire escape or fire fighting unusually difficult, the *fire code official* is authorized to declare it to be a hazard, notify the owner of such condition and order its correction in a manner consistent with these minimum safeguards.

**9301.2.2 Exempt buildings.** The *fire code official* and the Director of the Seattle Department of Construction and Inspections may exempt high-rise buildings that meet the requirements of Section 403 of the 1982 *Seattle Building Code* from complying with the provisions of this chapter.

**9301.2.3 Conflicts.** If there is a conflict between the provisions of this chapter and the provisions of an ordinance or code adopted after January 23, 1982, the provisions of the later adopted ordinance or code apply.

**9301.3 Definitions.** For the purpose of this chapter, certain words shall be construed as specified in this section.

**CENTRAL STATION:** A fire alarm reporting service listed by the Underwriters Laboratories or authorized by the *fire code official* to report alarms to the Seattle Fire Department Alarm Center. In lieu of connection to a central station listed by Underwriters Laboratories, the *fire code official* may approve building staff monitoring of a fire alarm annunciator panel if:

1. Such staff are properly trained to monitor the annunciator panel and report alarm signals to the fire department alarm center via the 9-1-1 system.
2. One or more building staff is on duty 24 hours a day and remains in the direct vicinity of the annunciator panel, e.g., a hotel desk clerk if the panel is behind the registration desk.
3. Staff persons are available in low income high-rise buildings whose primary duty requires them to be at the front desk.

**DEAD-END CORRIDOR:** A corridor that permits only one direction of travel from a unit or normally occupied room door to an exit, or that intersects an exit corridor on one end and does not provide an exit path on the other end. A corridor that has fire escapes directly accessible from it is not a dead-end corridor.

**FLOOR USED FOR HUMAN OCCUPANCY:** A floor designed and intended for occupancy by one or more persons for any part of a day, including a roof garden and an active storage area. An area that is permanently unoccupied or is occupied for the service of building equipment only is not included in this definition.

**HIGH-RISE BUILDING:** Buildings having floors used for human occupancy located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

**LOW INCOME RESIDENTIAL BUILDINGS:** Those buildings that meet the following requirements:

1. At least 50 percent of the dwelling or housing units as defined in the Seattle Housing and Building Maintenance Code (Seattle Municipal Code Chapter 22.204) are rented to non-transient persons at a rent at or below 0.9 percent of the current median income for all families in the Seattle area as determined by the United States Department of Housing and Urban Development; and

## MINIMUM STANDARDS FOR HIGH-RISE BUILDINGS

2. The average monthly rent for all dwelling or housing units in the building does not exceed 1.4 percent of the Median Income Limit.

For purposes of calculating the average monthly rent, a room that is rented on a hostel-style basis to three or more non-related persons is considered as one room rented for \$200 per month.

Monthly rent includes all charges for shelter and provision of items normally associated with such use, but does not include board, health care, telephone charges and other such items.

## SECTION 9302 EXITS

**9302.1 General.** All exits in high-rise buildings shall be illuminated as required in Section 1104 of this Code and enclosed with a minimum of one-hour fire resistive construction. Every high-rise building shall have at least one such exit. If existing exterior fire escapes are used for additional exits, they shall be tested and identified as required in Section 9302.3.

**9302.2 Smokeproof enclosure.** Where a high-rise building has a single, enclosed exit, the enclosure shall be continued to the exterior of the building, the exit shall be smoke-proof by mechanical ventilation in accordance with Section 3310 of the 1982 *Seattle Building Code*, or mechanically pressurized with fresh air to 0.15 inches water column and shall have a concurrent 2500 cubic feet per minute (cfm) (1180 L/s) exhaust to atmosphere in an emergency, in accordance with the provisions of the Building Code.

### Exceptions:

1. Pressurization may be omitted if the building has an *approved* automatic sprinkler system, all corridor openings are self-closing, all occupied areas have access to a second means of egress or a fire escape and the omission is *approved* by the *fire code official*.
2. A single stair may exit through a building lobby, if the lobby is of non-combustible construction, does not contain combustible furnishings, and is separated from the rest of the building by one-hour fire resistive construction. Wire-glass protected by sprinklers on both sides may be accepted as one-hour fire-resistive construction. If the lobby contains no combustible materials, wire-glass need only be protected by sprinklers on the side opposite the lobby.

**9302.3 Fire escapes.** Exterior fire escapes shall be accessible and structurally safe at all times. Owners of high-rise buildings shall load test fire escapes at least once every five years with a weight of not less than 100 pounds per square foot (488 kg/m<sup>2</sup>). The results of such a load test shall be submitted in writing to the *fire code official*. In lieu of such a test, the *fire code official* may accept the opinion of a structural engineer licensed by the State of Washington describing his inspection and/or tests and stating that the fire escape is structurally safe and will support a load of 100 pounds per square foot (488 kg/m<sup>2</sup>). There shall be signs *approved* by the *fire code official* clearly identifying the route of access to the fire escape from every public corridor. Fire escapes that are not maintained structurally safe and not otherwise required by provisions of the Fire Code shall be removed. Locked doors or windows are prohibited between public corridors and fire escapes.

**Exceptions:** If all of the following criteria are met and *approved* by the *fire code official*:

1. An identified tool or device for opening the locked door or window is permanently affixed in close proximity to the locked point.
2. The area around the locked door or window is served by emergency illumination.
3. Clearly understandable directions indicating the use of the tool and the route to the fire escape are posted at the locked door or window.

**9302.4 Doors.** All exit doors in the path of exit travel shall be self-closing or automatic closing in accordance with Section 713.6 of the 1982 Building Code. Doors held open by fusible links and sliding or vertical doors are prohibited in exit ways. Stairway doors shall be self-latching.

**9302.5 Unlocking of doors.** Stairway doors, including the doors between any stairway and the roof, shall not have locks or shall unlock automatically whenever a fire alarm is activated in the high-rise building. Such locks shall unlock automatically when power is off (fail safe). If the only locked door in a stair shaft is the one that leads to the roof, it may be locked by panic hardware or *approved* alarm lock-paddle bars.

**9302.6 Egress from stairways.** Enclosed stairways serving more than six floors shall have two means of egress from the stairway. Enclosed stairways serving ten or more floors shall have re-entry into the building at approximately five-story intervals. Re-entry signs shall be posted in the stair.

### Exceptions:

1. Jails.
2. If telephones connected to a 24-hour manned location are provided in the stairway in each five-floor increment that does not have a means of egress.

3. If any door serving as an entrance to the stair does not automatically lock behind a person entering the stair.
4. If alternate means of alerting building management to persons trapped in a stairwell are *approved* by the *building official*.

### SECTION 9303 DEAD-END CORRIDORS

**9303.1 Dead-end corridors.** Dead-end corridors are limited to 75 feet (22 860 mm) in length in office occupancies and 30 feet (9144 mm) in length in all other occupancies. If such limits are exceeded, automatic sprinkler protection meeting the requirements of the Fire Code and the Building Code shall be provided for the entire dead-end corridor, with one head on the room side of each door opening onto the corridor. Domestic water systems may be used to supply such sprinklers when *approved* by the *fire code official*.

#### Exceptions:

1. In high-rise buildings, inactive doors leading from the dead-end corridor into spaces that are not in normal use may be covered with 5/8-inch (16 mm) type “x” gypsum board or its equivalent, in lieu of installing a sprinkler head over the door or smoke detector in the room.
2. In office occupancies, sprinkler heads on the room side of each door opening onto the corridor need not be installed.
3. In residential buildings, if corridors and each guest room are equipped with electrically supervised heat detectors connected to the building fire alarm system, sprinkler heads, or any combination thereof. If heat detectors are used in rooms in lieu of sprinklers, doors must be rated at 20 minutes and must be self-closing.
4. In office occupancies, sprinkler systems are not required in a dead-end corridor if the corridor is equipped with smoke detectors and each room opening onto the corridor is equipped with at least one smoke detector. Such detector shall be electrically supervised and connected to the building fire alarm system.
5. If there is a fire escape not directly accessible from the corridor and the exit route is protected by electrically supervised smoke detection.
6. Corridors within residential units are exempt.
7. Corridors within private offices may have corridor only smoke detection connected to the building alarm systems.

### SECTION 9304 FIRE RESISTIVE CONSTRUCTION

**9304.1 Fire separation.** Any space larger than 1,500 square feet (139 m<sup>2</sup>) shall be separated from building stair shafts, elevator shafts and air handling shafts by non-combustible smoke resistive separation (glass walls with wood stops are acceptable) and equipped with smoke detectors connected to the building fire alarm system.

#### Exceptions:

1. Spaces that have *approved* automatic sprinkler systems.
2. Building lobbies or corridors which are equipped with an *approved* smoke control system that includes shaft pressurization and automatic smoke removal.
3. Building lobbies or corridors of any size that do not contain combustible furnishings (other than carpet) or commercial spaces and have non-combustible interior finish throughout.

**NOTE:** To qualify for exception 3, all spaces adjacent to the building lobby must be separated and equipped with smoke detectors as outlined in this section, and all doors leading into the lobby must be self-closing or automatically closing upon activation of the building fire alarm system.

4. Office areas above the main lobby, including open space design areas.

**NOTE:** This exception does not apply to retail or wholesale stores, display rooms, restaurants, cocktail lounges and bars, banquet rooms, meeting rooms, storage rooms and spaces that, because of unusual fuel load or other conditions, pose an unusual hazard in the opinion of the *fire code official*.

5. Smoke detectors are not required in spaces that are separated by one-hour fire-resistive construction, with openings protected by one-hour self-closing doors. Domestic water systems may be used to supply the sprinkler system referred to in this section if *approved* by the *fire code official*.

**9304.2 Shaft enclosures.** All openings that connect three or more floors shall be enclosed with a minimum of one-hour fire resistive construction.

**Exception:** Openings complying with Sections 304.6 or 402 of the 1982 Seattle Building Code.

## MINIMUM STANDARDS FOR HIGH-RISE BUILDINGS

### SECTION 9305 HEATING, VENTILATION AND AIR CONDITIONING SYSTEM (HVAC) SHUTDOWN

**9305.1 Air moving systems.** Air moving systems that serve more than the floor on which they are located shall automatically shut down on any high-rise building fire alarm, or shall be provided with a manual shutdown switch located at the fire alarm panel in the main building lobby.

**Exception:** Air moving systems of:

1. Less than 2,000 CFM.
2. Exhaust only systems of less than 15,000 CFM, such as toilet, range hood, kitchen, fume hood, etc.
3. HVAC systems of less than 15,000 CFM with automatic shut-down on smoke detectors in the area served, which are connected to the building fire alarm system.
4. Life safety pressurization systems as provided in the Building Code.
5. Buildings with *approved* automatic smoke control pursuant to Section 1807 of the 1982 edition of the Seattle Building Code.

### SECTION 9306 FIRE ALARM AND DETECTION SYSTEMS

**9306.1 General.** Every high-rise building, except a residential occupancy with a system installed under Ordinance 106107 as now or hereafter amended, shall have an electrically supervised fire alarm and detection system *approved* by the *fire code official*, as follows:

A manual pull station shall be located at every floor exit door, except in office occupancies.

The alarm system for the high-rise building shall be monitored by a central station, or other such means *approved* by the *fire code official*. The alarm systems shall be electrically supervised and have battery emergency power sufficient to operate for a period of 24 hours and sound the alarm for 10 minutes at the end of that period.

**9306.2 Automatic smoke detection.** There shall be electrically supervised automatic smoke detection in elevator landings, public corridors, and on the corridor or floor side of each exit stairway.

**Exception:** If a corridor has an *approved* automatic sprinkler system, smoke detectors may be omitted from the corridor.

There shall be electrically supervised automatic smoke detectors within 50 feet (15 240 mm) of building perimeter walls and at standard spacing (approximately 30 feet (9144 mm)) to the center of the floor.

**Exceptions:**

1. Interior of residential units.
2. Floors that have an *approved* automatic sprinkler system.
3. Parking garages.
4. Building Mechanical Spaces.
5. Any space above the top occupied floor.

**9306.3 Rooms without sprinklers.** There shall be electrically supervised automatic heat or smoke detection in rooms used for storage, shops, handicraft, janitor, trash and similar purposes where the fuel load may be significantly higher than the average floor fuel load and no automatic sprinkler system exists.

**Exceptions:**

1. Rooms with an *approved* automatic sprinkler system.
2. Rooms under 10 square feet (0.9 m<sup>2</sup>) opening onto exit corridors.
3. Rooms under 100 square feet (9 m<sup>2</sup>) not opening onto exit corridors.
4. Rooms within residential units.
5. Rooms where the storage is in closed metal containers.
6. Rooms other than those opening onto a corridor and within 30 feet (9144 mm) of an electrically supervised automatic smoke detector.

**9306.4 Audibility.** Alarm systems shall have audible devices producing a slow “whoop” sound audible at 15 dBA above ambient sound levels with a minimum of 60 dBA throughout residential occupancies and 10 dBA above ambient sound levels with a minimum of 55 dBA throughout other occupancies, and shall have a microphone capable of making voice announcements simultaneously to all floors. The alarm shall sound at a minimum on the floor where the fire is occurring and the floor above, and the alarm system shall be capable of sounding a general alarm throughout the high-rise building. The alarm system shall be designed so that a general alarm may be activated from two separate locations.

**9306.4.1 Zones.** Fire alarm systems shall be zoned per floor.

**9306.4.2 Panels.** There shall be an annunciator panel in the main lobby of a high-rise building or in such other areas *approved by the fire code official* as an emergency control center.

**9306.5 Automatic sprinklers.** If an automatic sprinkler system has been installed for fire protection, the water flow alarm shall be connected to the building fire alarm.

**Exception:** Where automatic smoke detectors are installed in the area and zoned, a single water flow alarm may be used.

**9306.6 Elevator shafts.** For purposes of Section 9306, wiring for fire alarm and fire detection systems may be installed in elevator shafts, if:

1. Such wiring shall not interfere with the safe operation of the elevator.
2. Such wiring shall be enclosed within metal conduit and all junction boxes shall be located outside the shaft.
3. All wiring work shall be done under applicable permit obtained from the Seattle Department of Construction and Inspections.

**9306.7 Elevator recall.** A fire alarm originating on a floor other than the main lobby floor shall cause all elevators to be returned to the main floor in accordance with Chapter 30 of the 1982 *Seattle Building Code*. Whenever new elevator controllers are installed, they shall meet provisions of the current Seattle Building and Elevator Codes. Newly installed controllers shall have the capability of selecting alternate recall floors.

**Exception:** Freight elevators with manually operated doors.

## SECTION 9307 EMERGENCY POWER

**9307.1 General.** High-rise buildings not meeting the Building Code in effect at the time of the original adoption of this article shall have, as a minimum, emergency power as follows:

1. Stairway pressurization emergency power shall be provided by an on-site diesel engine generator set. Such power shall start automatically on fire alarm and the generator set shall have a two-hour fuel supply.
2. Exit signs and pathway illumination shall have emergency power by trickle charged storage batteries. Such batteries shall have a capacity to provide required illumination for 90 minutes.
3. Fire alarm emergency power shall be provided as required in Section 9306.

## SECTION 9308 SIGN REQUIREMENTS

**9308.1 General.** All signs in this section shall be *approved by the fire code official* and have graphic symbols if possible. In hotels, signs must have graphic symbols. Sign lettering shall follow Appendix I-C of the 1982 *Seattle Fire Code*. A sign shall be posted on the room side of every hotel guest room indicating the relationship of that room to the exits and fire extinguishers, and giving basic information on what to do in the event of fire in the building.

**9308.2 Stairs.** Signs shall be provided on the stairway side of every stair door indicating the number of the stair, the floor that the door serves, the high-rise building re-entry points, and stair termination.

**9308.3 Elevators.** A sign shall be posted in every elevator lobby above each call switch noting that the elevators will be recalled to the building lobby on fire alarm. This sign shall warn persons not to use the elevator in the event of fire and direct them to use the stairway. If exit signs are not clearly visible from the elevator lobby, signs shall be installed to indicate the direction to stair and fire escape exits.

**9308.4 Emergency illumination.** Emergency illumination shall be provided at the elevator lobby sign location.

**9308.5 Exit identification.** "NOT AN EXIT" signs shall be installed at all doorways, passageways, or stairways that are not exits, exit accesses or exit discharges, and that may be mistaken for an exit. A sign indicating the use of the doorway, passageway, or stairway, such as "to basement," "storeroom," or "linen closet," is permitted in lieu of the "NOT AN EXIT" sign.

## SECTION 9309 EMERGENCY PREPAREDNESS

**9309.1 Emergency plan.** Owners of high-rise buildings shall prepare an emergency operations plan in accordance with Section 403 of the 1982 Seattle Building Code. In addition to the requirements of Section 403 of the 1982 Seattle Building Code, the emergency operations plan shall specify the duties during a fire emergency of the building management and staff, the building fire safety directors and floor wardens as identified in Section 9309.2.

## MINIMUM STANDARDS FOR HIGH-RISE BUILDINGS

**9309.2 Building staff training.** Owners of high-rise buildings shall designate from existing staff a building fire safety director who shall be responsible for the operation of the building fire protection equipment. Owners of high-rise buildings and/or tenants employing over 100 persons shall designate a floor warden for each floor to be responsible for evacuating the people on their respective floors in emergencies. The names and work locations of the director and the floor wardens shall be maintained on a roster contained in the building emergency operations plan.

### Exceptions:

1. Residential condominiums and apartment occupancies not employing staff.
2. Office and retail occupancies after normal business hours.

**NOTE:** In residential buildings employing staff, if there are not enough staff to appoint a floor warden for each floor, wardens shall be appointed to the fire floor, the floor above and as many additional floors as possible. In buildings where only one staff person is available, that person will be the Fire Safety Director.

**9309.3 Fire drills.** The staff of high-rise buildings shall conduct, and the occupants thereof shall participate in, fire drills on a regular basis as established in Chapter 4 of the 2021 Seattle Fire Code.

## CHAPTER 94

# FIRE PROTECTION FOR COVERED BOAT MOORAGE

**Note:** Chapter 94 is entirely Seattle amendments to the *International Fire Code* and is not underlined.

### Chapter 94 Point of Information

The requirements of this chapter originated in City of Seattle Ordinance 121773, effective May 18, 2005. The requirements of this ordinance apply to all covered moorage marina facilities in existence on the effective date of May 18, 2005.

### SECTION 9401 GENERAL

**9401.1 Scope.** This chapter applies to covered portions of all marinas with covered boat moorage in existence at the time of its adoption.

**Exceptions:**

1. *Approved* designated facilities and shipyards in accordance with Administrative Rule 26.02.04, *Designated Hot Work Facilities and Shipyards*.
2. Boathouses.

**9401.2 Intent.** This chapter is intended to promote the health, safety and welfare of life and property from fire at covered boat moorage.

**9401.3 Modifications.** The retroactive requirements of this chapter may be modified if their application clearly would be impractical for economic or physical reasons in the judgment of the *fire code official*, and only if it is clearly evident that a reasonable degree of safety is provided.

**9401.4 Signage.** Conspicuous signage shall be located at the fire apparatus access road termination point and the shore end of piers, wharves and floats. Signage shall indicate the address, directions and maps if required by the *fire code official*. For those structures that are designed to support vehicles, signage shall indicate the weight limit. Numbers and letters shall be easily legible and have high contrast with the color of the sign background. Numbers and letters shall not be less than 5 inches (127 mm) in height and shall have a minimum stroke of 0.5 inches (13 mm).

**9401.5 Smoking restrictions.** Smoking is prohibited in all areas where fuels and other flammable and combustible liquids and gases are stored or dispensed, in battery rooms, and in other such locations as management or the *fire code official* designate. "No Smoking" signs shall be conspicuously posted.

**9401.6 Transmittal of fire emergency.** All marinas and boatyards shall have a means to notify the fire department rapidly in the event of an emergency. If a telephone is used for this purpose, it shall be available for use at all times and shall not require the use of a coin. The street address of the facility and the emergency telephone number(s) shall be displayed prominently on a sign at the telephone.

**9401.7 Labeling electrical shutoffs.** Electrical transformers, control panels, and breaker panels shall be readily accessible, clearly labeled and indicate the areas they service. See also Section 603.4.1.

**9401.8 Fire extinguishers.** One portable fire extinguisher having a minimum rating of 2A 20-BC shall be provided within 75 feet (22 860 mm) of all portions of piers, wharves, and floats, or at each required hose station. Additional fire extinguishers, suitable for the hazards involved, shall be provided and maintained in accordance with Section 906 and NFPA Standard 10.

### SECTION 9402 DEFINITIONS

**9402.1 Definitions.** The following words and terms shall, for the purposes of this chapter, have the meanings shown here.

**BERTH** is the water space to be occupied by a boat or other *vessel* alongside or between bulkheads, piers, piles, fixed and floating docks, or any similar access structure. (See also definition for Slip.)

**BOATHOUSE** is an independently floating structure designed to be moored to a main float system to enclose and protect a *vessel* or *vessels*. A boathouse is capable of being moved on water, but is typically moored to a float system for long periods of time.

**COVERED BOAT MOORAGE** is a pier or system of floating or fixed accessways to which *vessels* on water may be secured and is covered by a roof.



## FIRE PROTECTION FOR COVERED BOAT MOORAGE

**DRAFT CURTAIN.** A structure arranged to limit the spread of smoke and heat along the underside of the ceiling or roof.

**FIRE PARTITION** is a vertical assembly of materials designed to restrict the spread of fire in which openings are protected.

**FLOAT** is a floating structure normally used as a point of transfer for passengers and goods, or both, for mooring purposes.

**GRAVITY-OPERATED DROP OUT VENTS.** Automatic smoke and heat vents containing heat-sensitive glazing designed to shrink and drop out of the vent opening when exposed to fire.

**MARINA** is any portion of the ocean or inland water, either naturally or artificially protected, for the mooring, servicing, or safety of *vessels* and includes artificially protected works, the public or private lands ashore, and structures or facilities provided within the enclosed body of water and ashore for the mooring or servicing of *vessels* or the servicing of their crews or passengers.

**MARINE MOTOR FUEL-DISPENSING FACILITY.** That portion of property where flammable or combustible liquids or gases used as fuel for watercraft are stored and dispensed from fixed equipment on shore, piers, wharves, floats, or barges into the fuel tanks of watercraft and includes all other facilities used in connection therewith.

**PIER** is a structure, usually of greater length than width, of timber, stone, concrete or other material, having a deck and projecting from the shore into waters so that *vessels* may be moored alongside for loading, unloading, storage, repairs or commercial uses.

**SLIP** is a berthing space between or adjacent to piers, wharves, or docks; the water areas associated with boat moorage. (See also definition for Berth.)

**WHARF OR QUAY** is a structure of timber, stone, concrete or other material having a platform built along and parallel to waters so that *vessels* may be moored alongside for loading, unloading, storage, repairs or commercial uses.

### SECTION 9403 PLANS AND APPROVALS

**9403.1 Plans.** Plans for marina fire-protection shall be *approved* prior to installation. The work shall be subject to final inspection and approval after installation.

### SECTION 9404 ACCESS AND WATER SUPPLY

**9404.1 Fire apparatus access roads.** Fire apparatus access roads shall be provided and so located as to provide fire department apparatus access to within 150 feet (45 720 mm) travel distance to the shore end of all marina piers, wharves, and floats. Fire apparatus access roads shall be in accordance with Appendix D of the 2003 Seattle Fire Code.

**Exception:** If *approved* by the *fire code official*, a Class I standpipe system may be installed on piers, wharves, or floats if conditions are such that providing fire department access lanes to within 150 feet (45 720 mm) to the shore end of the piers, wharves, and floats is not practical. Additional standpipe requirements are found in Section 9405.1.

**9404.2 Premises access.** The fire department shall have access to fenced, gated, or locked grounds, piers, wharves or floats. Appropriate means of access (including keys and cardkeys) shall be provided in an *approved* secured lock box (Knox Box) on the premises in an *approved* location. The fire department shall be notified immediately of any changes in the means of access.

**9404.3 Fire hydrants.** At least two fire hydrants shall be provided. One hydrant shall be located within 500 feet (152 400 mm) of the closest point of fire department apparatus access to the shore end of the marina piers, wharves or floats, or to the fire department connection for those piers, wharves or floats that are equipped with standpipes. The second fire hydrant shall be located within 1000 feet (304 800 mm) of the closest point of fire department apparatus access to the shore end of the marina piers, wharves, or floats, or to the fire department connection for those piers, wharves or floats that are equipped with standpipes.

**Exception:** The requirements for fire hydrants may be modified if alternate arrangements are *approved* by the *fire code official*.

**9404.4 Water supply.** All required hydrants shall be capable of delivering not less than 1,000 gpm at a minimum residual pressure of 20 psi each.

**Exception:** The requirements for water supply may be modified if alternate arrangements are *approved* by the *fire code official*.

## SECTION 9405 FIRE PROTECTION EQUIPMENT

**9405.1 Standpipe systems.** A manual Class I standpipe system (or class III standpipe system if *approved* by the *fire code official*) in accordance with NFPA Standard 14 shall be provided for piers, wharves, and floats if the hose lay distance from the fire apparatus to the most remote accessible portion of the pier, wharf, or float exceeds 150 feet (45 720 mm). *Approved* plastic pipe may be used if installed underwater, or other *approved* method of protection from fire is provided. The standpipe piping shall be a minimum of 4 inches (102 mm), sized to provide a minimum of 500 gpm at 130 psi at the most remote hose connection, with a simultaneous flow of 500 gpm at the third most remote hose connection on the same pier while maintaining a maximum system pressure of 175 psi. Existing standpipe systems providing equivalent performance to the specification listed above may be acceptable if *approved* by the *fire code official*.

**9405.1.1 Hose connections.** Hose connections on required standpipes shall be provided at the water end of the pier, wharf, or float, and along the entire length of the pier, wharf, or float at spacing not to exceed 150 feet (45 720 mm) and as close as practical to the land end.

**Exception:** The hose connection at the land end of the pier, wharf or float may be omitted if a hose connection is located within 150 feet (45 720 mm) of the fire apparatus access road. Each hose connection shall consist of a valved 2-1/2-inch (64 mm) fire department hose outlet. Outlet caps shall have a predrilled 1/8-inch (3 mm) hole for pressure relief and be secured with a short length of chain or cable to prevent falling after removal. Listed equipment shall be used.

**9405.2 Automatic sprinkler systems.** Automatic sprinklers shall be provided for each separate covered boat moorage area exceeding 8,000 square feet (743 m<sup>2</sup>) in projected roof area, excluding roof overhangs. A separate covered boat moorage area is one that has at least 16 feet uncovered horizontal separation from any part of any adjacent covered boat moorage area.

The sprinkler system shall be designed and installed in accordance with NFPA Standard 13 for Extra Hazard Group 2 occupancy.

**Exception:** Covered boat moorage already protected by an automatic sprinkler system is not required to be upgraded to Extra Hazard Group 2 criteria.

**9405.2.1 Monitoring.** Sprinkler systems shall be monitored by an *approved* central station.

**9405.3 Smoke and heat vents.** *Approved* automatic smoke and heat vents shall be provided in covered boat moorage areas exceeding 2,500 square feet (232 m<sup>2</sup>) in area, excluding roof overhangs.

**Exception:** Smoke and heat vents are not required in areas protected by automatic sprinklers.

**9405.3.1 Design and installation.** If smoke and heat vents are required they shall be installed near the roof peak, evenly distributed and arranged so that at least one vent is over each covered berth. The effective vent area shall be calculated using a ratio of one square foot (0.1 m<sup>2</sup>) of vent to every 15 square feet (1.4 m<sup>2</sup>) of covered berth area (1:15). Each vent shall provide a minimum opening size of 4 feet by 4 feet (1219 mm by 1219 mm).

**9405.3.1.1** Smoke and heat vents shall operate automatically by actuation of a heat-responsive device rated at between 100 degrees F (56 degrees C) and 220 degrees F (122 degrees C) above ambient.

**Exception:** Gravity-operated drop out vents.

**9405.3.1.2 Gravity-operated drop out vents.** Gravity operated dropout vents shall fully open within 5 minutes after the vent cavity is exposed to a simulated fire represented by a time-temperature gradient that reaches an air temperature of 500 degrees F (260 degrees C) within 5 minutes.

**9405.4 Draft curtains.** Draft curtains shall be provided in covered boat moorage areas exceeding 2,500 square feet (232 m<sup>2</sup>) in area, excluding roof overhangs.

**Exception:** Draft curtains are not required in areas protected by automatic sprinklers.

**9405.4.1 Draft curtain construction.** Draft curtains shall be constructed of sheet metal, gypsum board or other *approved* materials that provide equivalent performance to resist the passage of smoke. Joints and connections shall be smoke tight.

**9405.4.2 Draft curtain location and depth.** The maximum area protected by draft curtains shall not exceed 2,000 square feet (186 m<sup>2</sup>) or two slips or berths, whichever is smaller. Draft curtains shall not extend past the piling line. Draft curtains shall have a minimum depth of 2 feet (609 mm) below the lower edge of the roof and shall not extend closer than 8 feet (2438 mm) to the walking surface on the pier.

**9405.5 Fire department connections.** Standpipe and sprinkler systems shall be equipped with not less than one two-way 2 1/2-inch (64 mm) fire department connection, which shall be readily visible and located at the fire apparatus access road or other *approved* location. The fire department connection for class I standpipe systems may be located at the shore end of the pier, wharf, or float if the distance between the fire apparatus access road and fire department connection is less than 150 feet (45 720 mm). See also Section 9404.3, Fire hydrants.

**9405.6 Marina fire protection confidence testing.** Standpipe and sprinkler systems shall be inspected and hydrostatically tested per Administrative Rule 9.02.24, Inspection, Testing, Maintenance and Reporting Requirements for Fire Protection and

## FIRE PROTECTION FOR COVERED BOAT MOORAGE

Life Safety Systems, Private Hydrants and Emergency Responder Communication Enhancement Systems. Reports of inspections and tests shall be submitted to the Seattle Fire Department Confidence Testing Unit in accordance with Administrative Rule 9.02.24, Inspection, Testing, Maintenance and Reporting Requirements for Fire Protection and Life Safety Systems, Private Hydrants and Emergency Responder Communication Enhancement Systems. Notwithstanding fire department inspections, maintenance and periodic testing are the owner's responsibility. All persons performing such work shall have a certificate from the fire department to perform such work. See Administrative Rule 9.01.20, *Certificates of Competency for Installing, Inspecting, Testing and Maintaining Fire Protection Systems*.

**9405.7 Moorage in intervening moorage space.** *Vessels* moored in open spaces between covered moorage shall not exceed 7 feet (2137 mm) from the top of the *vessel* superstructure to the waterline, unless protected by an *approved* fire partition.

## SECTION 9406 EMERGENCY PLANS AND TRAINING

**9406.1 Emergency plan.** Owners or operators of piers, wharves, floats and marinas shall prepare and maintain a current emergency plan for the facility. The plan shall include procedures for fire department notification, fire evacuation, and include location of portable fire extinguishers and hose cabinets, sprinkler and standpipe system control valves, fire department connections and electrical disconnects.

**9406.2 Signage.** Signs, posters, or posted instructions shall be provided where practicable to remind the public of basic fire safety practices and to warn of unusual or extreme fire hazards. All boat owners at the marina shall be provided with written instructions for reporting fires and other emergencies and actions to be taken in the event of a fire.

### 9406.2 Point of Information

For examples of emergency plans, see information bulletins located at <https://www.seattle.gov/fire/safety-and-community/workplace-fire-safety>

**9406.3 Employee training.** Practice drills shall be held a minimum of twice a year.

**9406.3.1** All employees shall know the location of fire-fighting equipment, and shall be instructed in the procedures for response to a fire or other emergency, response to a fire alarm, reporting a fire or other emergency to the proper authorities (and to designated facility employees), and in the employees' designated role(s) in emergency situations. See Section 9406.

**9406.3.2** All employees, including office personnel, shall be given training in the use of portable fire extinguishers.

**9406.4 Fire department liaison.** If requested by the Seattle Fire Department, management shall assist the fire department in pre-fire planning for the following:

1. Entries and access routes for equipment within the premises,
2. Location, construction, use, and accessibility of all buildings and all their subdivisions including basements, storage lockers, and other areas,
3. Location and extent of outside working areas,
4. Location and means of access to both dry and wet boat-storage areas,
5. Type and capacity of standpipes on piers and walkways, including all points where connection of hydrant or pumper supplies can be affected,
6. Types and capacities of facility equipment, including work or tow boats, portable pumps, pier-mounted hose cabinets, all portable fire extinguishers, and other equipment,
7. Voltages and capacities of electrical systems, and location of electrical disconnecting means.

## SECTION 9407 OPERATIONAL HAZARDS

**9407.1** The marina or boatyard operator shall post in a prominent location or provide to boat operators using a marina or boatyard for mooring, repair, servicing, or storage, a list of safe operating procedures containing the following:

1. Procedures for disposal of trash;
2. Location of nonsmoking areas;
3. Location of fire extinguishers and hoses;
4. Procedures for turning in a fire alarm; and
5. Fueling procedures.

**9407.2 Fueling operations.** Fueling of floating marine craft with Class I fuels at other than a marine motor fuel-dispensing facility is prohibited. Fueling of floating marine craft with Class II or III fuels at other than a marine motor fuel-dispensing facility shall be in accordance with Section 2310.

**SECTION 9408  
COMPLIANCE**

**9408.1 Compliance.** All corrections that may be necessary to provide the minimum fire safety requirements established in this Chapter shall be completed by the owners as follows:

1. The *fire code official* shall develop a procedure for surveying marinas to effect compliance with this chapter. The *fire code official* shall send written and signed notices to the owners of all non-complying marinas. Within 120 days of the date of notification by the *fire code official*, the owner shall submit to the *fire code official* a concept design and firm schedule for complying with the requirements of this chapter.
2. The *fire code official* shall review the concept design and firm schedule and respond in writing. The time schedule for compliance shall be measured from the date of the *fire code official's* response to the concept design and firm schedule for each marina, and shall not exceed the time limits set forth in subsection (3) of this section.
3. The time limits for complying with the requirements of this chapter are as follows:

Fire Extinguishers	1 year
Signage	1 year
Emergency Plan	1 year
Smoke and Heat Vents and Draft Curtains	7 years
Fire Hydrants	5 years
Standpipes	7 years
Sprinkler Systems	10 years
4. Marinas will not be deemed to be in violation of this chapter until the time limits set forth in subsection (3) above have expired. Appeals to compliance with this section shall be in accordance with Section 111.

## Part VII—Appendices

### APPENDIX A BOARD OF APPEALS

*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.*

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**User note:**

**About this appendix:** Appendix A contains optional criteria that, when adopted, provide jurisdictions with detailed appeals, board member qualifications and administrative procedures to supplement the basic requirements found in Section 111 of this code.

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#### SECTION A101 GENERAL

~~[S] **A101.1 Scope.** A board of appeals shall be established as needed within the jurisdiction for ~~((the purpose of hearing applications for modification of the requirements of this code pursuant to the provisions of Section 111))~~ appeals of Fire Department decisions or actions pertaining to the application and interpretation of the Fire Code. The board shall be established and operated in accordance with this section, and shall be authorized to hear evidence from appellants and the *fire code official* pertaining to the application and intent of this code. ~~((for the purpose of issuing orders pursuant to these provisions:))~~~~

The board of appeals's recommendations are advisory only, and are not binding on the Seattle Fire Department. If the Fire Chief declines the board of appeals's recommendations, the Fire Chief will state the reasons why in writing. A copy of this statement shall be provided to the applicant, the members of the Fire Code Advisory Board, the Mayor's Office and the City Councilmember who chairs the City Council's Public Safety Committee.

The board of appeals is only established for specific issues and is dissolved once the appeal process is complete for each such issue.

~~[S] **(A101.2 Application for appeal.** Any person shall have the right to appeal a decision of the *fire code official* to the board. An application for appeal shall be based on a claim that the intent of this code or the rules legally adopted hereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equally good or better form of construction is proposed. The application shall be filed on a form obtained from the *fire code official* within 20 days after the notice was served.~~

~~**A101.2.1 Limitation of authority.** The board shall not have authority to waive requirements of this code or interpret the administration of this code.~~

~~**A101.2.2 Stays of enforcement.** Appeals of notice and orders, other than Imminent Danger notices, shall stay the enforcement of the notice and order until the appeal is heard by the board.)~~

[S] **A101.2 Membership.** The membership of the board shall consist of five Fire Code Advisory Board members, three of whom have the qualifications established by this section. Members shall be selected by the Chair of the Fire Code Advisory Board. The Fire Code Advisory Board Chair, at his/her discretion, may appoint or substitute additional Board members to hear a given appeal if he/she believes particular expertise is needed for particular appeals. The board of appeals shall select a chair.

[S] **A101.2.1 Design professional.** One member shall be a practicing design professional registered in the practice of engineering or architecture in the state in which the board is established (architect, chemical engineer or mechanical engineer position on the Fire Code Advisory Board).

[S] **A101.2.2 General public.** One member shall be from the general public position on the Fire Code Advisory Board.

[S] **A101.2.3 General industry or business representative.** One member shall be a representative of business or industry (building owners and manager association, fire insurance industry, Port of Seattle, services industry, marine industry, manufacturing/warehousing industry, fire protection industry, labor representative, major institutions, or research/lab industry position on the Fire Code Advisory Board).

~~[S] **(A101.3 Membership of board.** The board shall consist of five voting members appointed by the chief appointing authority of the jurisdiction. Each member shall serve for **[NUMBER OF YEARS]** years or until a successor has been appointed. The board member's terms shall be staggered at intervals, so as to provide continuity. The *fire code official* shall be an ex-officio member of said board but shall not vote on any matter before the board.~~

APPENDIX A

~~**A101.3.1 Qualifications.** The board shall consist of members who are qualified by experience and training to pass on matters pertaining to hazards of fire, explosions, hazardous conditions or *fire protection systems*, and are not employees of the jurisdiction.~~

~~**A101.3.2 Alternate members.** The chief appointing authority is authorized to appoint two alternate members who shall be called by the board chairperson to hear appeals during the absence or disqualification of a member. Alternate members shall possess the qualifications required for board membership, and shall be appointed for the same term or until a successor has been appointed.~~

~~**A101.3.3 Vacancies.** Vacancies shall be filled for an unexpired term in the same manner in which original appointments are required to be made.~~

~~**A101.3.4 Chairperson.** The board shall annually select one of its members to serve as chairperson.~~

~~**A101.3.5 Secretary.** The chief appointing authority shall designate a qualified clerk to serve as secretary to the board. The secretary shall file a detailed record of all proceedings, which shall set forth the reasons for the board's decision, the vote of each member, the absence of a member and any failure of a member to vote.)~~

[S] ~~((**A101.3.6**))~~ **A101.3 Conflict of interest.** A member with any personal, professional or financial interest in a matter before the board shall declare such interest and refrain from participating in discussions, deliberations and voting on such matters.

[S] ~~((**A101.3.7 Compensation of members.** Compensation of members shall be determined by law.~~

~~**A101.3.8 Removal from the board.** A member shall be removed from the board prior to the end of their terms only for cause. Any member with continued absence from regular meetings of the board may be removed at the discretion of the chief appointing authority.)~~

[S] ~~((**A101.4 Rules and procedures.** The board shall establish policies and procedures necessary to carry out its duties consistent with the provisions of this code and applicable state law. The procedures shall not require compliance with strict rules of evidence, but shall mandate that only relevant information be presented.))~~

[S] **A101.4 Procedures.** The board shall be operated in accordance with the procedures and timelines detailed in Sections A101.4.1 through A101.4.3.6.

[S] **A101.4.1 Preliminary steps to request review by the Board of Appeals.** Before requesting a review by the board of appeals, the applicant shall first explore resolution of the compliance problem by proposing modified Code requirements (Section 104.8) or alternative materials and methods (Section 104.9). Prior to requesting review, the applicant shall also discuss the particular compliance situation in depth with the following representatives of the Seattle Fire Department:

1. The appropriate inspector from the Fire Marshal's Office (FMO), the Fire Prevention Division of the Seattle Fire Department.
2. The FMO inspector's supervisor, if the matter cannot be resolved with the inspector.
3. The Fire Marshal, if the matter cannot be resolved with the supervisor.
4. If necessary, the Fire Chief, where agreement cannot be reached with the Fire Marshal.

After discussing the issue as detailed above, the applicant may then submit a written request for review by the board of appeals, addressed to the Fire Chief and sent to the Fire Marshal's attention, concisely stating the issues involved, the factual background, and the relevant section(s) of this code. The Fire Code Advisory Chair will determine if the applicant's request is within the scope of this code in consultation with the applicant and the Fire Marshal.

[S] **A101.4.2 The appeal process.** After the preliminary steps shown above have been pursued, and the applicant has submitted a written request for review by the board of appeals, the next steps in the appeals process, to be completed within the timelines detailed in Section A101.4.3, are as follows:

1. The Seattle Fire Department Technical Code Coordinator will notify the applicant when and where board of appeals meeting will occur.
2. Written statements and exhibits will be submitted to the Technical Code Coordinator from both the applicant and the Fire Department prior to the board of appeals meeting. These statements should include any relevant exhibits such as plans, as well as a list of any expert witnesses. The applicant and Fire Department must submit one copy of their respective statements and attachments for each board of appeals member, with an additional copy for the other party. The Technical Code Coordinator will deliver the copies to the respective parties.
3. The board of appeals will select its own chairperson. The applicant will make its presentation first, followed by the Fire Department. The applicant and the Fire Department should each be limited to 30 minutes for oral presentation, including questions from the board of appeals, unless the board of appeals Chair determines at the beginning of the meeting that more time is warranted. In any event, each party will be provided equal time to make its presentation to the board of appeals. Each party's oral presentation should address the factual background, the issues and the Seattle Fire Code sections involved. Each party may include design professionals or other persons in its presentation to the board of appeals.

4. The board of appeals may visit the site(s) involved in the compliance dispute, at the request of either the Fire Department or the applicant, or on the board of appeals's own initiative. The applicant shall make the site(s) available to the board of appeals for site visit(s). The site visit(s) will be scheduled through the Technical Code Development Director. No such site visit(s) will be made without a representative of both the Fire Department and the applicant present.
5. The board of appeals shall make its written recommendations concerning the particular compliance situation to the Fire Chief. A copy of the board of appeals's recommendations will also be provided to the applicant, the Fire Code Advisory Board (FCAB) Chair, and the other members of FCAB. A statement in the following form, signed by the appropriate officer, shall accompany each report:  

*This report has been submitted to ballot of the board of appeals which consists of five members, of whom \_\_\_\_\_ have voted affirmatively, \_\_\_\_\_ negatively, and \_\_\_\_\_ have not voted.*
6. The board of appeals's recommendations are advisory only, and are not binding on the Seattle Fire Department. If the Fire Chief declines the board of appeals's recommendations, the Fire Chief will state the reasons why in writing. A copy of this statement shall be provided to the applicant, the members of the FCAB, the Mayor's Office and the City Councilmember who chairs the City Council's Public Safety Committee. In every case, the Fire Marshal shall be available to meet with the applicant after the conclusion of the board of appeals review.

**[S] A101.4.3 Timelines for the appeal processes.** Timelines for the appeals processes shall be in accordance with Sections A101.4.3.1 through A101.4.3.6.

**[S] A101.4.3.1 Written request for review.** The applicant shall submit a written request for a board of appeals review to the Fire Chief within 10 *business days* after the Chief has notified the applicant of the Chief's decision on the applicant's particular compliance dispute.

**[S] A101.4.3.2 Notifying FCAB of a request for review.** The Fire Marshal, acting on behalf of the Fire Chief, will make a reasonable effort to notify the Fire Code Advisory Board Chair within three *business days* (Monday through Friday, holidays excepted) of receiving an applicant's written request for a review by the board of appeals. The Fire Marshal shall provide a copy of the applicant's written request to the FCAB Chair at this time.

**A101.4.3.3 Selecting members of the board of appeals.** The members of the board of appeals will be selected within five *business days* of the time that the FCAB Chair receives the applicant's written request for review from the Fire Marshal.

**A101.4.3.4 Scheduling the meeting.** The board of appeals will meet to review the applicant's compliance dispute within 15 *business days* from its selection by the FCAB Chair. The Technical Code Development Director will contact the FCAB Chair, the members of the board of appeals, the Seattle Fire Department and the applicant to schedule a place and time for the board of appeals's meeting(s).

**A101.4.3.5 Written statements and exhibits.** The applicant and the Seattle Fire Department will each submit a concise written statement of the issue(s), facts and relevant section(s) of this code involved to the Technical Code Development Director at least seven *business days* before the date of the first board of appeals meeting to consider the compliance dispute. The Technical Code Development Director will have these copies delivered at least three *business days* before the first board of appeals meeting.

**A101.4.3.6 The board of appeals's recommendations.** Within five *business days* of its final meeting or site visit regarding the compliance dispute, the board of appeals shall make its written recommendations concerning the particular compliance situation to the Fire Chief. A copy of the board of appeals's recommendations will also be provided to the applicant, the FCAB Chair, and the other members of FCAB. The board of appeals's review and advisory recommendations should be completed within 60 calendar days from the time that the Fire Chief notifies the applicant of the Chief's pre-appeal decision, although more time may be taken if both the applicant and the Fire Marshal agree to an extension of time.

**[S] ((A101.5 Notice of meetings.** The board shall meet upon notice from the chairperson within 10 days of the filing of an appeal or at stated periodic intervals.

**A101.5.1 Open hearing.** All hearings before the board shall be open to the public. The appellant, the appellant's representative, the *fire code official* and any person whose interests are affected shall be given an opportunity to be heard.

**A101.5.2 Quorum.** Three members of the board shall constitute a quorum.

**A101.5.3 Postponed hearing.** When five members are not present to hear an appeal, either the appellant or the appellant's representative shall have the right to request a postponement of the hearing.))

**[S] ((A101.6 Legal counsel.** The jurisdiction shall furnish legal counsel to the board to provide members with general legal advice concerning matters before them for consideration. Members shall be represented by legal counsel at the jurisdiction's expense in all matters arising from service within the scope of their duties.))

APPENDIX A

[S] (~~A101.7 Board decision.~~ The board shall only modify or reverse the decision of the *fire code official* by a concurring vote of three or more members.

~~A101.7.1 Resolution.~~ The decision of the board shall be by resolution. Every decision shall be promptly filed in writing in the office of the *fire code official* within three days and shall be open to the public for inspection. A certified copy shall be furnished to the appellant or the appellant's representative and to the *fire code official*.

~~A101.7.2 Administration.~~ The *fire code official* shall take immediate action in accordance with the decision of the board.)

[S] (~~A101.8 Court review.~~ Any person, whether or not a previous party of the appeal, shall have the right to apply to the appropriate court for a writ of certiorari to correct errors of law. Application for review shall be made in the manner and time required by law following the filing of the decision in the office of the chief administrative officer.)



## APPENDIX B

# FIRE-FLOW REQUIREMENTS FOR BUILDINGS

*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.*

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**User note:**

**About this appendix:** Appendix B provides a tool for the use of jurisdictions in establishing a policy for determining fire-flow requirements in accordance with Section 507.3. The determination of required fire flow is not an exact science, but having some level of information provides a consistent way of choosing the appropriate fire flow for buildings throughout a jurisdiction. The primary tool used in this appendix is a table that presents fire flow based on construction type and building area based on the correlation of the Insurance Services Office (ISO) method and the construction types used in the International Building Code®.

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### SECTION B101 GENERAL

[S] **B101.1 Scope.** The procedure for determining fire-flow requirements for buildings or portions of buildings hereafter constructed or when required by the fire code official for buildings undergoing a substantial alteration shall be in accordance with this appendix. This appendix does not apply to structures other than buildings.

### SECTION B102 DEFINITIONS

**B102.1 Definitions.** For the purpose of this appendix, certain terms are defined as follows:

**FIRE FLOW.** The flow rate of a water supply, measured at 20 pounds per square inch (psi) (138 kPa) residual pressure, that is available for fire fighting.

**FIRE-FLOW CALCULATION AREA.** The floor area, in square feet (m<sup>2</sup>), used to determine the required fire flow.

### SECTION B103 MODIFICATIONS

**B103.1 Decreases.** The *fire code official* is authorized to reduce the *fire-flow* requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full *fire-flow* requirements is impractical.

**B103.2 Increases.** The *fire code official* is authorized to increase the *fire-flow* requirements where conditions indicate an unusual susceptibility to group fires or conflagrations. An increase shall be not more than twice that required for the building under consideration.

**B103.3 Areas without water supply systems.** For information regarding water supplies for fire-fighting purposes in rural and suburban areas in which adequate and reliable water supply systems do not exist, the *fire code official* is authorized to utilize NFPA 1142 or the *International Wildland-Urban Interface Code*.

### SECTION B104 FIRE-FLOW CALCULATION AREA

**B104.1 General.** The *fire-flow calculation area* shall be the total floor area of all floor levels within the *exterior walls*, and under the horizontal projections of the roof of a building, except as modified in Section B104.3.

**B104.2 Area separation.** Portions of buildings that are separated by *fire walls* without openings, constructed in accordance with the *International Building Code*, are allowed to be considered as separate *fire-flow calculation areas*.

**B104.3 Type IA and Type IB construction.** The *fire-flow calculation area* of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors.

**Exception:** *Fire-flow calculation area* for open parking garages shall be determined by the area of the largest floor.

APPENDIX B

**SECTION B105  
FIRE-FLOW REQUIREMENTS FOR BUILDINGS**

**B105.1 One- and two-family dwellings, Group R-3 and R-4 buildings and townhouses.** The minimum *fire-flow* and flow duration requirements for one- and two-family *dwellings*, Group R-3 and R-4 buildings and *townhouses* shall be as specified in Tables B105.1(1) and B105.1(2).

**[S] TABLE B105.1(1)  
REQUIRED FIRE FLOW FOR ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES**

FIRE-FLOW CALCULATION AREA (square feet)	AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (gallons per minute)	FLOW DURATION (hours)
0–3,600	No automatic sprinkler system	1,000	1
3,601 and greater	No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2) at the required fire-flow rate
0–3,600	Section 903.3.1.3 of the <i>International Fire Code</i> or Section P2904 of the <i>International Residential Code</i>	<del>((500))</del> <u>300</u>	1/2
3,601 and greater	Section 903.3.1.3 of the <i>International Fire Code</i> or Section P2904 of the <i>International Residential Code</i>	<del>((1/2 value in Table B105.1(2)))</del> <u>300</u>	<del>((+))</del> <u>1/2</u>

For SI: 1 square foot = 0.0929 m<sup>2</sup>, 1 gallon per minute = 3.785 L/m.

**TABLE B105.1(2)  
REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2**

FIRE-FLOW CALCULATION AREA (square feet)					FIRE FLOW (gallons per minute) <sup>b</sup>	FLOW DURATION (hours)
Type IA and IB <sup>a</sup>	Type IIA and IIIA <sup>a</sup>	Type IV and V-A <sup>a</sup>	Type IIB and IIIB <sup>a</sup>	Type V-B <sup>a</sup>		
0–22,700	0–12,700	0–8,200	0–5,900	0–3,600	1,500	2
22,701–30,200	12,701–17,000	8,201–10,900	5,901–7,900	3,601–4,800	1,750	
30,201–38,700	17,001–21,800	10,901–12,900	7,901–9,800	4,801–6,200	2,000	
38,701–48,300	21,801–24,200	12,901–17,400	9,801–12,600	6,201–7,700	2,250	
48,301–59,000	24,201–33,200	17,401–21,300	12,601–15,400	7,701–9,400	2,500	
59,001–70,900	33,201–39,700	21,301–25,500	15,401–18,400	9,401–11,300	2,750	3
70,901–83,700	39,701–47,100	25,501–30,100	18,401–21,800	11,301–13,400	3,000	
83,701–97,700	47,101–54,900	30,101–35,200	21,801–25,900	13,401–15,600	3,250	
97,701–112,700	54,901–63,400	35,201–40,600	25,901–29,300	15,601–18,000	3,500	
112,701–128,700	63,401–72,400	40,601–46,400	29,301–33,500	18,001–20,600	3,750	
128,701–145,900	72,401–82,100	46,401–52,500	33,501–37,900	20,601–23,300	4,000	4
145,901–164,200	82,101–92,400	52,501–59,100	37,901–42,700	23,301–26,300	4,250	
164,201–183,400	92,401–103,100	59,101–66,000	42,701–47,700	26,301–29,300	4,500	
183,401–203,700	103,101–114,600	66,001–73,300	47,701–53,000	29,301–32,600	4,750	
203,701–225,200	114,601–126,700	73,301–81,100	53,001–58,600	32,601–36,000	5,000	
225,201–247,700	126,701–139,400	81,101–89,200	58,601–65,400	36,001–39,600	5,250	
247,701–271,200	139,401–152,600	89,201–97,700	65,401–70,600	39,601–43,400	5,500	
271,201–295,900	152,601–166,500	97,701–106,500	70,601–77,000	43,401–47,400	5,750	
295,901–Greater	166,501–Greater	106,501–115,800	77,001–83,700	47,401–51,500	6,000	
—	—	115,801–125,500	83,701–90,600	51,501–55,700	6,250	
—	—	125,501–135,500	90,601–97,900	55,701–60,200	6,500	
—	—	135,501–145,800	97,901–106,800	60,201–64,800	6,750	
—	—	145,801–156,700	106,801–113,200	64,801–69,600	7,000	
—	—	156,701–167,900	113,201–121,300	69,601–74,600	7,250	
—	—	167,901–179,400	121,301–129,600	74,601–79,800	7,500	
—	—	179,401–191,400	129,601–138,300	79,801–85,100	7,750	
—	—	191,401–Greater	138,301–Greater	85,101–Greater	8,000	

For SI: 1 square foot = 0.0929 m<sup>2</sup>, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

- a. Types of construction are based on the *International Building Code*.
- b. Measured at 20 psi residual pressure.

**B105.2 Buildings other than one- and two-family dwellings, Group R-3 and R-4 buildings and townhouses.** The minimum *fire-flow* and flow duration for buildings other than one- and two-family *dwellings*, Group R-3 and R-4 buildings and *townhouses* shall be as specified in Tables B105.1(2) and B105.2.

**[S] TABLE B105.2  
REQUIRED FIRE FLOW FOR BUILDINGS OTHER THAN ONE- AND TWO-FAMILY DWELLINGS,  
GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES**

AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (gallons per minute)	FLOW DURATION (hours)
No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2)
Section 903.3.1.1 of the <i>International Fire Code</i>	25% of the value in Table B105.1(2) <sup>a</sup>	Duration in Table B105.1(2) at the reduced flow rate
Section 903.3.1.2 of the <i>International Fire Code</i>	25% of the value in Table B105.1(2) <sup>b</sup>	Duration in Table B105.1(2) at the reduced flow rate
Section 903.3.1.1 or 903.3.1.2 of the <i>International Fire Code</i> , when a <u>sprinkler system is not otherwise required by the <i>International Fire Code</i> or <i>International Building Code</i></u>	<u>300</u>	<u>2</u>
Section 903.3.1.1 of the <i>International Fire Code</i> , when the <i>International Fire Code</i> or the <i>International Building Code</i> requires a sprinkler system <u>but would permit a system meeting Section 903.3.1.2</u>	<u>300</u>	<u>2</u>
For buildings required by the <i>International Fire Code</i> or <i>International Building Code</i> to install a sprinkler system designed to Section 903.3.1.1, <u>fire flow can be reduced where the system has a 25% increase in either sprinkler density, operating area, or sprinkler head design flow.</u>	<u>300</u>	<u>2</u>

For SI: 1 gallon per minute = 3.785 L/m.

- a. The reduced fire flow shall be not less than 1,000 gallons per minute.
- b. The reduced fire flow shall be not less than 1,500 gallons per minute.

**B105.3 Water supply for buildings equipped with an automatic sprinkler system.** For buildings equipped with an *approved automatic sprinkler system*, the water supply shall be capable of providing the greater of:

1. The *automatic sprinkler system* demand, including hose stream allowance.
2. The required *fire flow*.

## SECTION B106 REFERENCED STANDARDS

**B106.1 General.** See Table B106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

**TABLE B106.1  
REFERENCED STANDARDS**

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
IBC—21	<i>International Building Code</i>	B104.2
IRC—21	<i>International Residential Code</i>	Table B105.1(1)
IWUIC—21	<i>International Wildland-Urban Interface Code</i>	B103.3
NFPA 1142—17	<i>Standard on Water Supplies for Suburban and Rural Fire Fighting</i>	B103.3

## APPENDIX D

# FIRE APPARATUS ACCESS ROADS

*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.*

**User note:**

**About this appendix:** Appendix D contains more detailed elements for use with the basic access requirements found in Section 503, which gives some minimum criteria, such as a maximum length of 150 feet and a minimum width of 20 feet, but in many cases does not state specific criteria. This appendix, like Appendices B and C, is a tool for jurisdictions looking for guidance in establishing access requirements and includes criteria for multiple-family residential developments, large one- and two-family subdivisions, specific examples for various types of turnarounds for fire department apparatus and parking regulatory signage.

### SECTION D101 GENERAL

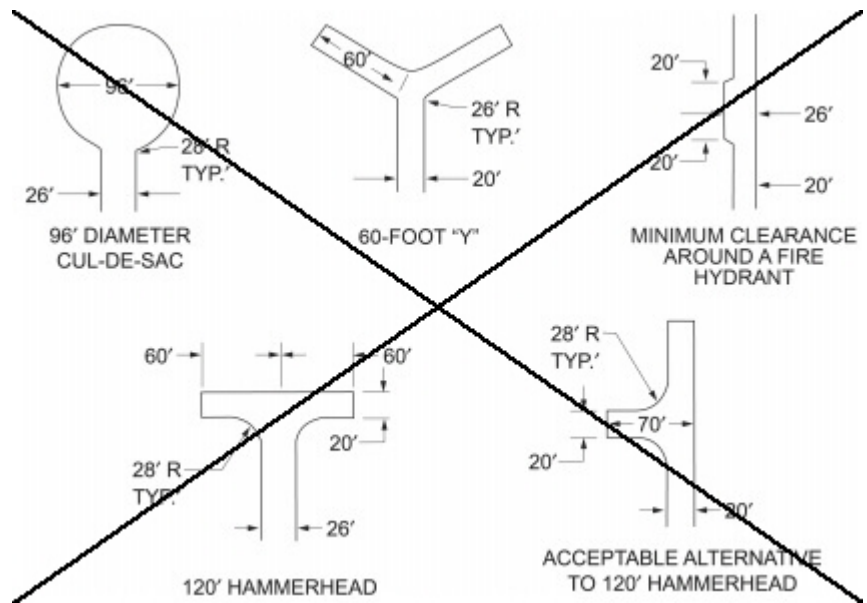
[S] **D101.1 Scope.** Fire apparatus access roads other than public streets shall be in accordance with this appendix and all other applicable requirements of the *International Fire Code*.

### SECTION D102 REQUIRED ACCESS

[S] **D102.1 Access and loading.** Facilities, buildings or portions of buildings hereafter constructed, substantially altered or moved into or within the jurisdiction when required by the fire code official shall be accessible to fire department apparatus by way of an *approved* fire apparatus access road with an asphalt, concrete or other *approved* driving surface capable of supporting the imposed load of fire apparatus weighing up to 75,000 pounds (34 050 kg).

### SECTION D103 MINIMUM SPECIFICATIONS

[S] ~~((D103.1 Access road width with a hydrant. Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet (7925 mm), exclusive of shoulders (see Figure D103-1).))~~



((For SI: 1 foot = 304.8 mm.

~~**FIGURE D103-1  
DEAD-END FIRE APPARATUS ACCESS ROAD TURNAROUND**~~

**APPENDIX D**

[S] (~~D103.2~~) **D103.1 Grade.** Fire apparatus access roads shall not exceed 10 percent in grade.

**Exception:** Grades steeper than 10 percent as *approved* by the *fire code official*.

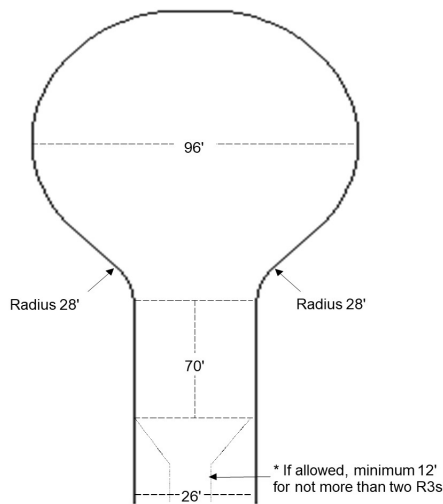
[S] (~~D103.3~~) **D103.2 Turning radius.** The minimum turning radius shall be determined by the *fire code official*.

[S] (~~D103.4~~) **D103.3 Dead ends.** Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) shall be provided with width and turnaround provisions in accordance with Table (~~D103.4~~) **D103.3** and Figure D103.3.

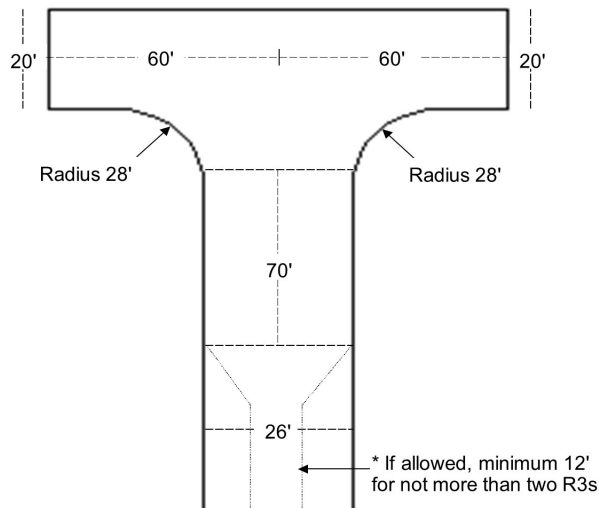
**[S] TABLE (~~D103.4~~) D103.3  
REQUIREMENTS FOR DEAD-END FIRE APPARATUS ACCESS ROADS**

LENGTH (feet)	WIDTH (feet)	TURNAROUNDS REQUIRED
0–150	20	None required
151–500	20	120-foot Hammerhead, 60-foot “Y” or 96-foot-diameter cul-de-sac in accordance with Figure D103.1
501–750	26	120-foot Hammerhead, 60-foot “Y” or 96-foot-diameter cul-de-sac in accordance with Figure D103.1
Over 750		Special approval required

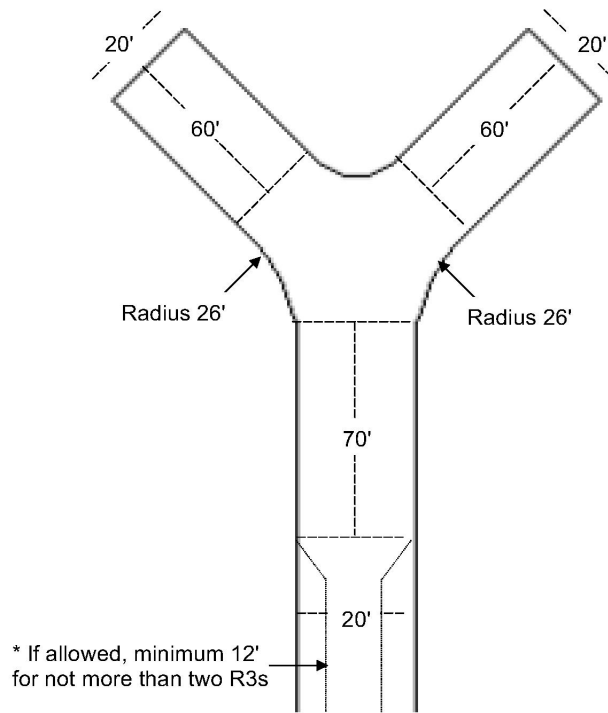
For SI: 1 foot = 304.8 mm.



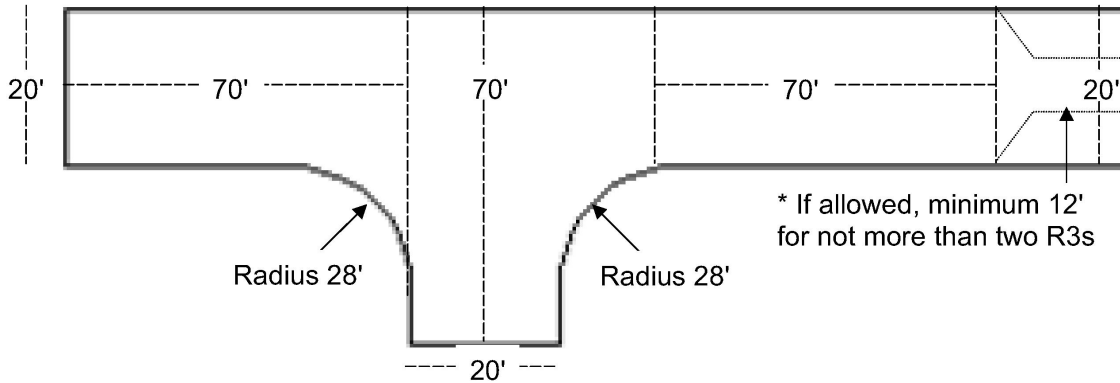
**96-Foot Cul-de-Sac**



**120-Foot Hammerhead**



**60-Foot Y – Acceptable Alternative to 120-Foot Hammerhead**



**Acceptable Alternative to 120-Foot Hammerhead**

**FIGURE D103.3  
DEAD-END FIRE APPARATUS ACCESS ROAD TURNAROUND**

[S] (~~D103.5~~) **D103.4 Fire apparatus access road gates.** Gates securing the fire apparatus access roads shall comply with all of the following criteria:

1. Where a single gate is provided, the gate width shall be not less than 20 feet (6096 mm). Where a fire apparatus road consists of a divided roadway, the gate width shall be not less than 12 feet (3658 mm).  
**Exception:** Access roads serving not more than two Group R-3 or Group U occupancies shall have an unobstructed width of not less than 12 feet (3658 mm).
2. Gates shall be of the horizontal swing, horizontal slide, vertical lift or vertical pivot type.
3. Construction of gates shall be of materials that allow manual operation by one person.
4. Gate components shall be maintained in an operative condition at all times and replaced or repaired when defective.
5. Electric gates shall be equipped with a means of opening the gate by fire department personnel for emergency access. Emergency opening devices shall be *approved* by the fire code official.

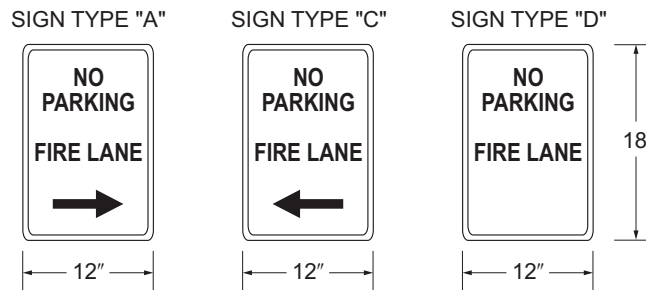
6. Methods of locking shall be submitted for approval by the *fire code official*.

**Exception:** Bollards are an approved alternate if they can be readily removed by one person, and they shall not be locked with a padlock or chain unless they are capable of being removed by means of a forcible entry tool or approved locking device.

7. Electric gate operators, where provided, shall be *listed* in accordance with UL 325.

8. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F2200.

[S] ~~(D103.6)~~ **D103.5 Signs.** Where required by the *fire code official*, fire apparatus access roads shall be marked with permanent “NO PARKING—FIRE LANE” signs complying with Figure D103.6. Signs shall have a minimum dimension of 12 inches (305 mm) wide by 18 inches (457 mm) high and have red letters on a white reflective background. Signs shall be posted on one or both sides of the fire apparatus road as required by Section ~~(D103.6.1 or D103.6.2)~~ **D103.5.1 or D103.5.2.**



**FIGURE D103.6  
FIRE LANE SIGNS**

[S] ~~(D103.6.1)~~ **D103.5.1 Roads ((20)) 12 to 26 feet in width.** *Fire lane* signs as specified in Section ~~(D103.6)~~ **D103.5** shall be posted on both sides of fire apparatus access roads that are ~~((20))~~ **12** to 26 feet wide (6096 to 7925 mm).

[S] ~~(D103.6.2)~~ **D103.5.2 Roads more than 26 feet in width.** *Fire lane* signs as specified in Section D103.6 shall be posted on one side of fire apparatus access roads more than 26 feet wide (7925 mm) and less than 32 feet wide (9754 mm).

## **SECTION D104 COMMERCIAL AND INDUSTRIAL DEVELOPMENTS**

[S] **D104.1 Buildings exceeding three stories or 30 feet in height.** Buildings or facilities exceeding 30 feet (9144 mm) or three stories in height shall have not fewer than two means of fire apparatus access for each structure.

**Exception:** Projects that have a single approved fire apparatus access road when all buildings are equipped throughout with approved automatic sprinkler systems.

**D104.2 Buildings exceeding 62,000 square feet in area.** Buildings or facilities having a gross *building area* of more than 62,000 square feet (5760 m<sup>2</sup>) shall be provided with two separate and *approved* fire apparatus access roads.

**Exception:** Projects having a gross *building area* of up to 124,000 square feet (11 520 m<sup>2</sup>) that have a single *approved* fire apparatus access road where all buildings are equipped throughout with *approved automatic sprinkler systems*.

**D104.3 Remoteness.** Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the lot or area to be served, measured in a straight line between accesses.

## **SECTION D105 AERIAL FIRE APPARATUS ACCESS ROADS**

[S] **D105.1 Where required.** Where the vertical distance between the *grade plane* and the highest roof surface exceeds 30 feet (9144 mm), *approved* aerial fire apparatus access roads shall be provided. For purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of parapet walls, whichever is greater.

### **Exceptions:**

1. Where *approved* by the *fire code official*, buildings of Type IA, Type IB or Type IIA construction equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 and having fire fighter access

through an enclosed *stairway* with a Class I standpipe from the lowest level of fire department vehicle access to all roof surfaces.

2. One- and two-family dwellings and townhouses.

**D105.2 Width.** Aerial fire apparatus access roads shall have a minimum unobstructed width of 26 feet (7925 mm), exclusive of shoulders, in the immediate vicinity of the building or portion thereof.

**D105.3 Proximity to building.** One or more of the required access routes meeting this condition shall be located not less than 15 feet (4572 mm) and not greater than 30 feet (9144 mm) from the building, and shall be positioned parallel to one entire side of the building. The side of the building on which the aerial fire apparatus access road is positioned shall be *approved* by the *fire code official*.

**D105.4 Obstructions.** Overhead utility and power lines shall not be located over the aerial fire apparatus access road or between the aerial fire apparatus road and the building. Other obstructions shall be permitted to be placed with the approval of the *fire code official*.

**SECTION D106  
MULTIPLE-FAMILY RESIDENTIAL DEVELOPMENTS**

**D106.1 Projects having more than 100 dwelling units.** Multiple-family residential projects having more than 100 *dwelling units* shall be equipped throughout with two separate and *approved* fire apparatus access roads.

**Exception:** Projects having up to 200 *dwelling units* shall have not fewer than one *approved* fire apparatus access road where all buildings, including nonresidential occupancies, are equipped throughout with *approved automatic sprinkler systems* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

**D106.2 Projects having more than 200 dwelling units.** Multiple-family residential projects having more than 200 *dwelling units* shall be provided with two separate and *approved* fire apparatus access roads regardless of whether they are equipped with an *approved automatic sprinkler system*.

**D106.3 Remoteness.** Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses.

**SECTION D107  
ONE- OR TWO-FAMILY RESIDENTIAL DEVELOPMENTS**

**D107.1 One- or two-family dwelling residential developments.** Developments of one- or two-family *dwellings* where the number of *dwelling units* exceeds 30 shall be provided with two separate and *approved* fire apparatus access roads.

**Exceptions:**

1. Where there are more than 30 *dwelling units* accessed from a single public or private fire apparatus access road and all *dwelling units* are equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, access from two directions shall not be required.
2. The number of *dwelling units* accessed from a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the *fire code official*.

**D107.2 Remoteness.** Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses.

**SECTION D108  
REFERENCED STANDARDS**

**D108.1 General.** See Table D108.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

**TABLE D108.1  
REFERENCED STANDARDS**

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM F2200—14	<i>Standard Specification for Automated Vehicular Gate Construction</i>	<del>((D103.5))</del> D103.4
UL 325—02	<i>Door, Drapery, Gate, Louver, and Window Operators and Systems, with Revisions through May 2015</i>	<del>((D103.5))</del> D103.4