Government of Pakistan

Building Code of Pakistan
Fire Safety Provisions - 2016

Building Code of Pakistan - Fire Safety Provisions - 2016
(Based on NFPA 1 Fire Code - 2015)

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Pakistan Engineering Council

in collaboration with

National Disaster Management Authority

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REGISTERED No. M – 302 / L.–7646

THE GAZETTE OF PAKISTAN

EXTRAORDINARY

PUBLISHED BY AUTHORITY

ISLAMABAD, TUESDAY, NOVEMBER 22, 2016

PART II

Statutory Notifications (S. R. O.)

GOVERNMENT OF PAKISTAN

MINISTRY OF SCIENCE AND TECHNOLOGY

NOTIFICATION

Islamabad, the 31st October, 2016

S. R. O. 1073 (I)/2016.–In exercise of the powers conferred by Section 25 of the Pakistan Engineering Council Act, 1975 (V of 1976), the Governing Body of the Pakistan Engineering Council, with the previous sanction of the Federal Government, is pleased to direct that the following further amendments shall be made in the Pakistan Engineering Council (Construction and Operation of Engineering Works) Bye-laws, 1987, namely: –

In the aforesaid bye-laws, after bye-law 10, the following new bye-law shall be added, namely:–

*"**11. Application of Building Code of Pakistan-Fire Safety Provisions-2016**.*–(1) The Building Code of Pakistan-Fire Safety Provisions-2016 provide rules for fire prevention, life safety in relation to fire and fire protection of building and structures as prescribed. Building Code of Pakistan-Fire Safety Provisions-2016 shall be adopted by the federal and provincial governments, organizations, authorities, both public and private, as notified.

(2) Construction and modification of buildings in violation of Building Code of Pakistan (Fire Safety Provisions-2016) shall be considered as violation of professional engineering works as specified under clause (xxv) of section 2 of the Act.

(3) The implementation and enforcement of this bye-law shall vest with the Authority Having Jurisdiction (AHJ) within their respective jurisdictions and circles as follow:

(1) Building Control, Housing and Development Authorities
(2) District Administration
(3) Tehsil or Town Administration
(4) Municipal Administration
(5) Station Headquarters (Army, Air Force and Navy)
(6) Cantonment Administration
(7) Union Council Administration
(8) Autonomous Bodies
(9) Industrial Estates
(10) Directorates of Civil Defense
(11) Export Processing Zones
(12) Other Federal/Provincial Authorities as and when notified

(4) This Bye-law shall come into force upon being notified and all the concerned AHJs shall implement the same immediately in the prescribed manner.

(5) All relevant AHJs shall ensure compliance and implementations of this Code and accordingly adopt or amend their relevant regulations, Bye-laws or rules as the need be.

(6) This Bye-law shall apply to both new and existing buildings.

(a) buildings permitted for construction after the adoption of these Provisions shall comply with the provisions stated herein for new buildings forthwith.

(b) existing buildings constructed prior to adoption of these provisions shall comply with the provisions stated herein as soon as possible but not later than three years of notification of these provisions; and

(c) minimum fire protection requirements such as provision of fire alarm and detection system, fire extinguishers, emergency response plans and fire drills shall however be in place as soon as possible but not later than one year of notification of these provisions.

(7) Any person who fails to comply with this Bye-law or fails to carry out an order made pursuant to these provisions, or violates any condition attached to a permit, approval, or certificate shall be subject to the penalties in accordance with the regulations of AHJ.

(8) These provisions shall first be reviewed and updated after five years of notification, and thereafter every five years or earlier, on the basis of data and feedback received by the committee, as constituted by Pakistan Engineering Council".

[File No. PEC/SRO/CONSLT/FSP/16.]

ENGR. JAWED SALIM QURESHI,
Chairman,
Pakistan Engineering Council.

REGISTERED No. M – 302 / L.–7646

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S. R. O. 1074 (I)/2016.–In exercise of the powers conferred by Section 25 of the Pakistan Engineering Council Act, 1975 (V of 1976), the Governing Body of the Pakistan Engineering Council, with the previous sanction of the Federal Government, is pleased to direct that the following further amendments shall be made in the Pakistan Engineering Council (Conduct and Practice of Consulting Engineers) Bye-laws, 1986, namely: –

In the aforesaid bye-laws, after bye-law 12, the following new bye-law shall be added, namely:–

*"**13. Application of Building Code of Pakistan-Fire Safety Provisions-2016**.*–(1) The Building Code of Pakistan-Fire Safety Provisions-2016 provide rules for fire prevention, life safety in relation to fire and fire protection of building and structures as prescribed. Building Code of Pakistan-Fire Safety Provisions-2016 shall be adopted by the federal

and provincial governments, organizations, authorities, both public and private, as notified.

(2) Construction and modification of buildings in violation of Building Code of Pakistan (Fire Safety Provisions-2016) shall be considered as violation of professional engineering works as specified under clause (xxv) of section 2 of the Act.

(3) The implementation and enforcement of this bye-law shall vest with the Authority Having Jurisdiction (AHJ) within their respective jurisdictions and circles as follow:

(1) Building Control, Housing and Development Authorities
(2) District Administration
(3) Tehsil or Town Administration
(4) Municipal Administration
(5) Station Headquarters (Army, Air Force and Navy)
(6) Cantonment Administration
(7) Union Council Administration
(8) Autonomous Bodies
(9) Industrial Estates
(10) Directorates of Civil Defense
(11) Export Processing Zones
(12) Other Federal/Provincial Authorities as and when notified

(4) This Bye-law shall come into force upon being notified and all the concerned AHJs shall implement the same immediately in the prescribed manner.

(5) All relevant AHJs shall ensure compliance and implementations of this Code and accordingly adopt or amend their relevant regulations, Bye-laws or rules as the need be.

(6) This Bye-law shall apply to both new and existing buildings.

(a) buildings permitted for construction after the adoption of these Provisions shall comply with the provisions stated herein for new buildings forthwith.

(b) existing buildings constructed prior to adoption of these provisions shall comply with the provisions stated herein as soon as possible but not later than three years of notification of these provisions; and

(c) minimum fire protection requirements such as provision of fire alarm and detection system, fire extinguishers, emergency response plans and fire drills shall however be in place as soon as possible but not later than one year of notification of these provisions.

(7) Any person who fails to comply with this Bye-law or fails to carry out an order made pursuant to these provisions, or violates any condition attached to a permit, approval, or certificate shall be subject to the penalties in accordance with the regulations of AHJ.

(8) These provisions shall first be reviewed and updated after five years of notification, and thereafter every five years or earlier, on the basis of data and feedback received by the committee, as constituted by Pakistan Engineering Council".

[File No. PEC/SRO/CONSLT/FSP/16.]

ENGR. JAWED SALIM QURESHI,
Chairman,
Pakistan Engineering Council.

Preface

On directives of Government of Pakistan, Pakistan Engineering Council (PEC) has developed following codes and standards to adopt, promote and introduce the modern technological advancements in the country:

- Building Code of Pakistan (Seismic Provisions-2007)
- Building Code of Pakistan (Energy Provisions-2013)
- Pakistan Electric and Telecommunication Safety Code (PETSAC-2014)
- Building Code of Pakistan (Fire Safety Provisions-2016)

Every year a significant number of casualties and injuries occur as a result of fire incidents in the country. Unfortunately, about 70% deaths took placed in existing buildings including housing, commercial and industrial units only due to non-provisions of fire safety and fire protection systems. A large number of major fire incidents happened in big cities during year 2015-16, wherein a significant number of people perished by fire with massive loss of material and property apart from creating environmental pollution.

The Government of Pakistan mandated National Disaster Management Authority (NDMA) through Ministry of Climate Change to mitigate and minimize major fire incidents in the country. For the purpose, PEC and NDMA signed an MoU for development of **Building Code of Pakistan (Fire Safety Provisions-2016)** on October 15, 2015.

PEC in collaboration and financial assistance extended by NDMA initiated the development of Building Code of Pakistan (Fire Safety Provisions-2016) which is benchmarked with NFPA 1 Fire Code 2015, National Fire Protection Association (NFPA). These provisions provide a unified system of fire prevention, fire protection and life safety standards for safeguarding human lives and reducing material loss to residential, commercial and industrial buildings. These Provisions will help for Disaster Risk Reduction and Disaster Risk Management to minimize vulnerabilities and adverse impacts in case of fire incidents.

Building Code of Pakistan (Fire Safety Provisions-2016) shall be adopted by all concerned organizations (public and private) associated with housing and industrial sectors of the country. The Statutory Notification through Ministry of Law and Justice shall provide general legal cover for adoption and enforcement of these provisions. The notification shall also allow required improvements and changes in these provisions after five years, or earlier, after feedback from relevant stakeholders. The implementation and enforcement of Building Code of Pakistan (Fire Safety Provisions-2016) shall vest with the Authority Having Jurisdiction (AHJ) within their respective jurisdictions and circles as follow:

1. Building Control, Housing and Development Authorities
2. District Administration
3. Tehsil or Town Administration
4. Municipal Administration
5. Station Headquarters (Army, Air Force and Navy)
6. Cantonment Administration
7. Union Council Administration
8. Autonomous Bodies
9. Industrial Estates
10. Directorates of Civil Defense
11. Export Processing Zones
12. Other Federal/Provincial Authorities as and when notified

After notification by the Government of Pakistan, these Fire Safety Provisions-2016 shall be adopted as an integral part of Building Code of Pakistan. The relevant AHJ shall prepare a roadmap to implement these Provisions at grass-root level.

These Provisions shall be kept updated by a PEC Task Force under the aegis of PEC, comprising of representatives from regulators, companies, industry, engineering professionals and other stakeholders, through open consultation before any change is suggested.

Acknowledgement

This document includes valued inputs from eminent professionals, scientists, experts and stakeholders. While appreciating the efforts of these professionals, it is important to acknowledge the following members of PEC Task Force who contributed for development of Building Code of Pakistan (Fire Safety Provisions-2016);

1.	Engr. Syed Imtiaz Hussain Gilani, Project Director, University of Technology, Nowshera	Convener
2.	Engr. Dr. Prof. Sarosh Hashmat Lodi, Dean, Faculty of Civil Engg. & Arch., NED-UET, Karachi	Member
3.	Engr. Dr. Shahid Iqbal, Dean, Military College of Engg, NUST, Risalpur Campus,	Member
4.	Engr. Ahmed Kamal, Member DRR, NDMA, Islamabad	Member
5.	Engr. Dr. Prof. Muhammad Masood Rafi, Dept., Earthquake Engineering, NED, UET, Karachi	Member
6.	Mr. Khalid Nadeem, Vice President, FPAP / Advisor Fire Safety K-Electric, Karachi	Member
7.	Engr. Faiz Muhammad Bhutta, Senior Energy Consultant, Islamabad	Member
8.	Engr. Dr. M. Maqbool Sadiq Awan, Military College of Engg, NUST, Risalpur Campus	Member
9.	Mr. Nasir Jahangir Rifat Shaikh, Advocate Supreme Court of Pakistan, Karachi	Member
10.	Dr. Abdur Rahman, District Emergency Officer, Rescue 1122, Rawalpindi	Member
11.	Engr. Abdul Qayyum Ch. GM/ Head, Building Service Division, NESPAK, Lahore	Member
12.	Engr. Ijaz Ahmed, GM (QSC) Engineering Development Board, Islamabad	Member
13.	Engr. Muhammad Saleem, DG, Provincial Housing Authority, Khyber Pakhtunkhwa	Member
14.	Arc. Mohammad Tahir Banuri, Member Executive Committee, PCATP, Islamabad	Member
15.	Mr. Tariq Jawed Qazi, Director, Directorate General Civil Defence, Islamabad	Member
16.	Ms. Nasim Akhtar Qureshi, Director (Technical) NHA, M/o Housing &Works, Islamabad	Member
17.	Mr. Abrar Hassan, Manager Fire Fighting, Pakistan Ordinance Factories, Wah	Member
18.	Mr. Hasnain Mehmood, Rescue 1122, Rawalpindi	Member
19.	Engr. Khadim Hussain Bhatti, Registrar/ Secretary, PEC	Member
20.	Engr. Ghulam Karim, Deputy Registrar, CPD Department, PEC	Project Coordinator-I
21.	Env. Faiz ul Sibtain, Section Incharge, Think Tank Department, PEC	Project Coordinator-II

The support and financial assistance extended by National Disaster Management Authority (NDMA) for development of these Provisions is highly appreciated. Furthermore, the help provided by National Fire Protection Association (NFPA) is also acknowledged.

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Chapter 1 Administration

1.1 Scope

These Provisions cover the requirements for fire prevention, life safety in relation to fire and fire protection of buildings and building like structures. The Provisions specify construction, occupancy and protection features that are necessary to minimize danger to life and property from fire.

1.1.1 The scope includes, but is not limited to, the following:

(1) Inspection of permanent and temporary buildings, processes, equipment, systems, and other fire and related life safety situations

(2) Investigation of fires and fire related incidents

(3) Review of construction plans, drawings, and specifications for life safety systems, fire protection systems, access, water supplies, processes, hazardous materials, and other fire and life safety issues

(4) Fire and life safety education of fire brigades, employees, responsible parties, and the general public

(5) Assessment of existing occupancies and conditions, the design and construction of new buildings, remodeling of existing buildings, and additions to existing buildings

(6) Design, installation, alteration, modification, construction, maintenance, repairs, servicing, and testing of fire protection systems and equipment.

(7) Access requirements for fire department operations

(8) Hazards from outside fires in vegetation, trash, building debris, and other materials

(9) Regulation and control of special events including, but not limited to, assemblage of people, exhibits, tradeshows, outdoor events, and other similar special temporary and permanent occupancies

(10) Interior finish, decorations, furnishings, and other combustibles that contribute to fire spread, fire load, and smoke production

(11) Storage, use, processing, handling, and on-site transportation of flammable and combustible gases, liquids, and solids

(12) Storage, use, processing, handling, and on-site transportation of hazardous materials

(13) Control of emergency operations and scenes

(14) Conditions affecting fire fighter safety

(15) Arrangement, design, construction, and alteration of new and existing means of egress

1.1.2 Title. The title of these Provisions shall be Building Code of Pakistan, Fire Safety Provisions- 2016.

1.2 Purpose

The purpose of these Provisions is to prescribe minimum requirements necessary to establish a reasonable level of fire and life safety and property protection from the hazards created by fire and dangerous conditions.

1.3 Application

1.3.1 These Provisions shall apply to both new and existing buildings and building like structures.

1.3.2 Referenced Standards

1.3.2.1 Details regarding processes, methods, specifications, equipment testing and maintenance, design standards, performance, installation, or other pertinent criteria should be as specified in these Provisions. However, where these Provisions do not specify explicitly the codes and standards in Chapter 2, any approved code/standard shall be taken as guideline.

1.3.2.2 Where no applicable codes, standards, or requirements are set forth in these Provisions or contained within other laws, codes, provisions, ordinances, or bylaws adopted by Authority Having Jurisdiction (AHJ), compliance with applicable codes and standards of NFPA or any approved code/standard shall be deemed as prima facie evidence of compliance with the intent of these Provisions.

1.3.2.3 Nothing herein shall diminish the authority of AHJ to determine compliance with codes or standards for those activities or installations within AHJ's responsibility.

1.3.2.4 In those cases where AHJ determines that the existing situation constitutes an imminent danger, AHJ shall be permitted to apply retroactively any portions of the current referenced standards deemed appropriate.

1.3.3 Conflicts

1.3.3.1 When a requirement differs between these Provisions and a referenced document, the requirement of these Provisions shall apply.

1.3.3.2 When a conflict between a general requirement and a specific requirement occurs, the specific requirement shall apply.

1.3.4 Multiple Occupancies. Where two or more classes of occupancy occur in the same building or structure and are so intermingled that separate safeguards are impractical, means of egress facilities, construction, protection, and other safeguards shall comply with the most restrictive fire safety requirements of the occupancies involved.

1.3.5 Vehicles and Vessels. Vehicles, vessels, or other similar conveyances, when in fixed locations and occupied as buildings shall be treated as buildings and comply with these Provisions.

1.3.6 Buildings and Building like Structures

1.3.6.1 Buildings and building like structures permitted for construction after the adoption of these Provisions shall comply with the provisions stated herein for new buildings.

1.3.6.2 Existing buildings and building like structures prior to adoption of these Provisions shall comply within three years of notification of these Provisions.

1.3.6.2.1 Minimum fire protection requirements such as provision of fire alarm and detection system, fire extinguishers, emergency response plans and fire drills shall be in placed within one year of notification of these Provisions, where applicable.

1.3.6.3 Repairs, renovations, alterations, reconstruction, change of occupancy, and additions to buildings shall conform to these Provisions.

1.3.6.4 Newly introduced equipment, materials, and operations regulated by these Provisions shall comply with the requirements for new construction or processes.

1.3.7 Severability. If any of the Provision or the application thereof to any person or circumstance is held invalid, the remainder of these Provisions and the application of such provision to other persons or circumstances shall not be affected thereby.

1.4 Equivalencies, Alternatives, and Modifications

1.4.1 Equivalencies. Nothing in these Provisions is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety to those prescribed by these Provisions, provided technical documentation is submitted to AHJ to demonstrate equivalency and the system, method, or device is approved for the intended purpose.

1.4.2 Alternatives. The specific requirements of these Provisions shall be permitted to be altered by AHJ to allow alternative methods that will secure equivalent fire safety, but in no case shall the alternative afford less fire safety than that which would be provided by compliance with the provisions contained in these Provisions.

1.4.3 Each application for an alternative fire protection feature shall be filed with AHJ and shall be accompanied by such evidence, letters, statements, results of tests, or other supporting information as required to justify the request. AHJ shall keep a record of actions on such applications, and a signed copy of AHJ's decision shall be provided for the applicant.

1.4.4 Approval. AHJ shall approve such alternative construction systems, materials, or methods of design when it is substantiated that the standards of these Provisions are at least equaled. If, in the opinion of AHJ, the standards of these Provisions shall not be equaled by the alternative requested, approval for permanent work shall be refused. Consideration shall be given to test or prototype installations.

1.4.5 Tests.

1.4.5.1 Whenever evidence of compliance with the requirements of these Provisions is insufficient or evidence that any material or method of construction does not conform to the requirements of these Provisions, or to substantiate claims for alternative construction systems, materials, or methods of construction, AHJ shall be permitted to require tests for proof of compliance to be made by an approved agency at the expense of the owner or his/her agent.

1.4.5.2 Test methods shall be as specified by these Provisions for the material in question. If appropriate test methods are not specified in these Provisions, AHJ is authorized to accept an applicable test procedure from another recognized source.

1.4.5.3 Copies of the results of all such tests shall be retained in accordance with Section 1.11.

1.5 Units

1.5.1 International System of Units. Metric units of measurement in these Provisions are in accordance with the modernized metric system known as the International System of Units (SI).

1.5.2 Primary and Equivalent Values. If a value for a measurement as given in these Provisions is followed by an equivalent value in other units, the first stated value shall be regarded as the requirement. A given equivalent value could be approximate.

1.6 Enforcement

These Provisions shall be administered and enforced by AHJ as defined in these Provisions.

1.7 Authority

1.7.1 Administration. These Provisions shall apply without restriction, unless specifically exempted.

1.7.2 Minimum Qualifications to Enforce these Provisions. AHJ shall establish minimum qualifications for all persons assigned the responsibility of enforcing these Provisions.

1.7.3 Interpretations

1.7.3.1 AHJ is authorized to render interpretations of these Provisions taking help of experts. AHJ is authorized to make and enforce rules and supplemental provisions in order to carry out the application and intent of its provisions.

1.7.3.2 Such interpretations, rules, and provisions shall be in conformance with the intent and purpose of these Provisions and shall be available to the public during normal business hours.

1.7.4 Enforcement Assistance. Police and other enforcement agencies shall have authority to render necessary assistance in the enforcement of these Provisions when requested to do so by AHJ.

1.7.5 Delegation of Authority. AHJ shall be permitted to delegate to other qualified individuals such powers as necessary for the administration and enforcement of these Provisions.

1.7.6 Reliance on Other Enforcement Officials

1.7.6.1 AHJ shall be authorized to rely on plan reviews, inspections, opinions, and approvals rendered by other enforcement officials in determining compliance with these Provisions.

1.7.6.2 When AHJ relies on inspections, plan reviews, opinions, and approvals rendered by other enforcement officials in determining compliance with these Provisions, the other enforcement officials shall be deemed to be acting as agents under their own authority and not as agents of AHJ enforcing these Provisions.

1.7.7 Inspection

1.7.7.1 AHJ shall be authorized to inspect, at all reasonable times, any building or premises for dangerous or hazardous conditions or materials as set forth in these Provisions.

1.7.7.2 AHJ shall have authority to order any person(s) to remove or remedy such dangerous or hazardous condition or material. Any person(s) failing to comply with such order shall be in violation of these Provisions.

1.7.7.3 To the full extent permitted by law, any AHJ engaged in fire prevention and inspection work shall be authorized at all reasonable times to enter and examine any building, structure or premises for the purpose of making fire safety inspections.

1.7.7.4 Before entering, AHJ shall obtain the consent of the occupant thereof or obtain a court warrant or a written permission from the head of AHJ authorizing entry for the purpose of inspection except in those instances where an emergency exists.

1.7.7.5 As used in 1.7.7.4, emergency shall mean circumstances that AHJ knows, or has reason to believe, exist and that can constitute imminent danger.

1.7.7.6 Persons authorized to enter and inspect buildings, structures, vehicles, and premises as herein set forth shall be identified by credentials issued by the AHJ.

1.7.8 Where conditions exist and are deemed hazardous to life or property by AHJ, it shall have the authority to summarily abate such hazardous conditions that are in violation of these Provisions.

1.7.9 Interference with Enforcement. Persons shall not interfere or cause conditions that would interfere with an AHJ carrying out any duties or functions prescribed by these Provisions.

1.7.10 Impersonation. Persons shall not use a badge, uniform, or other credentials to impersonate AHJ.

1.7.11 Investigation

1.7.11.1 Authority. AHJ shall have the authority to investigate the cause, origin, and circumstances of any fire, explosion, release of hazardous materials, or other hazardous condition. Note see 3.3.87 for the definition of explosion.

1.7.11.2 Evidence. AHJ shall have the authority to take custody of all physical evidence relating to the cause of the fire, explosion, release of hazardous materials, or other hazardous condition.

1.7.11.3 Limiting Access. AHJ shall have the authority to limit access to emergencies or other similar situations.

1.7.11.4 Trade Secret. Information that could be related to trade secrets or processes shall not be made part of the public record except as could be directed by a court of law.

1.7.12 Plans and Specifications

1.7.12.1 AHJ shall have the authority to require plans and specifications to ensure compliance with applicable codes and standards.

1.7.12.2 Plans shall be submitted to AHJ prior to construction for approval.

1.7.12.3 The construction documents for each phase shall be complete in themselves, so that review and inspection can properly be made. Preliminary plans of the total building shall be submitted with the construction documents, and with sufficient detail, so that proper evaluation can be made. Areas and items not included in the phase to be permitted shall be shown as not included.

1.7.12.4 Plans shall be submitted to AHJ prior to the change of occupancy of any existing building.

1.7.12.5 Plans shall be submitted to AHJ prior to the alteration of the means of egress or fire protection systems of any existing building.

1.7.12.6 Plans shall be submitted to AHJ for other conditions as deemed necessary by AHJ to determine compliance with the applicable codes and standards.

1.7.12.7 AHJ shall be authorized to require permits for conditions listed in Sections 1.7.12.2, 1.7.12.4, and 1.7.12.5, unless otherwise permitted by Section 1.7.12.5.

1.7.12.8 AHJ is authorized to exempt detached one- and two-family dwellings and accessory structures from the permit requirement of Section 1.7.12.7.

1.7.12.9 No construction work shall proceed until AHJ has reviewed the plans for compliance with the applicable codes and standards and the applicable permits have been issued. The review of plans shall be carried out in the time stipulated in the regulations of AHJ.

1.7.13 Inspection of Construction and Installation

1.7.13.1 AHJ shall be notified by the owner or its designated representative when the installation is ready for a required inspection.

1.7.13.2 Whenever any installation subject to inspection prior to use is covered or concealed without having first been inspected, AHJ shall have the authority to require that such work be exposed for inspection.

1.7.13.3 When any construction or installation work is being performed in violation of the plans and specifications as approved by AHJ, a written notice shall be issued to the responsible party to stop work on that portion of the work that is in violation.

1.7.13.4 AHJ shall follow the approved procedure to issue the notice as stipulated in their regulations.

1.7.13.5 The notice shall state the nature of the violation, and no work shall be continued on that portion until the violation has been corrected.

1.7.14 Certificate of Occupancy. When the building code requires a certificate of occupancy, the certificate of occupancy shall not be issued until enforcement of these Provisions.

1.7.15 Stop Work Order. AHJ shall have the authority to order an operation, construction, or use stopped when any of the following conditions exists:

(1) Work is being done contrary to provision of these Provisions.

(2) Work is occurring without a permit required by Section 1.12.

(3) An imminent danger has been created.

1.7.16 Imminent Dangers and Evacuation

1.7.16.1 When, in the opinion of AHJ, an imminent danger exists, AHJ shall have the authority to order the occupants to vacate, or temporarily close for use or occupancy, a building, the right-of-way, sidewalks, streets, or adjacent buildings or nearby areas.

1.7.16.2 AHJ shall be authorized to employ the necessary resources to perform the required work in order to mitigate the imminent danger.

1.7.16.3 Costs incurred by AHJ in the performance of emergency work shall be the responsibility of the property owner or other responsible party creating such imminent danger.

1.7.17 Standby and Fire Watch Personnel

1.7.17.1 AHJ shall have the authority to require standby fire personnel or an approved fire watch when potentially hazardous conditions or a reduction in a life safety feature exist due to the type of performance, display, exhibit, occupancy, contest, or activity; an impairment to a fire protection feature; or the number of persons present.

1.7.17.2 The owner, agent or lessee shall employ one or more qualified persons, as required and approved, to be on duty.

1.7.17.2.1 The cost of standby fire personnel shall be at no cost to AHJ.

1.7.17.3 Such standby fire personnel or fire watch personnel shall be subject to AHJ's orders at all times and shall be identifiable and remain on duty during the times such places are open to the public, when such activity is being conducted, or as required by AHJ.

1.7.18 Public Fire Education

1.7.18.1 AHJ shall develop and implement a public fire safety education program as deemed necessary with respect to the potential fire hazards within the jurisdiction.

1.7.18.2 AHJ shall ensure that duly authorized public fire safety education programs or public fire safety messages are disseminated to the general public.

1.8 Duties and Powers of the Incident Commander

1.8.1 Incident Commander. The individual responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources. Incident commander shall be a representative of the local fire department.

1.8.2 Authority. The incident commander or authorized representative conducting operations in connection with the extinguishment and control of any fire shall have authority to direct all operations of fire extinguishment, and to take necessary precautions to save life, protect property, and prevent further injury or damage.

1.8.3 Controlling Scene. During any emergency described in 1.8.1, including the investigation of the cause of such emergency, the incident commander or authorized representative shall be permitted to control or prohibit the approach to the scene of such emergency by any vehicle, vessel, or person.

1.8.4 Obstruction of Operations. Persons shall not obstruct the operations of the fire department or disobey any command of the incident commander or authorized representative or any part thereof, or any order of a police officer assisting the fire department.

1.8.5 Scene Barrier. The incident commander or authorized representative in charge of an emergency scene shall have the authority to establish barriers to control access in the vicinity of such emergency and to place, or cause to be placed, ropes, guards, barricades, or other obstructions across any street or alley to delineate such emergency scene barrier.

1.8.6 Persons, except as authorized by the incident commander in charge of the emergency, shall not be permitted to cross barriers established in accordance with 1.8.5.

1.9 Liability

1.9.1 AHJ, and other individuals charged by AHJ, or the incident commander of emergency operations, charged with the enforcement of these Provisions or any other official duties acting in good faith and without malice in the discharge of their duties, shall not thereby be rendered personally liable for any damage that could accrue to persons or property as a result of any act or by reason of any act or omission in the discharge of their duties.

1.9.2 The fire department and AHJ, acting in good faith and without malice in the discharge of the organizations' public duty, shall not thereby be rendered liable for any damage that could accrue to persons or property as a result of any act or by reason of any act or omission in the discharge of such duties.

1.9.3 Any suit brought against AHJ, the incident commander, or such individuals because of such act or omission performed in the enforcement of any provision of such codes or other pertinent laws or ordinances implemented through the enforcement of these Provisions or enforced by the code enforcement agency shall be defended by this jurisdiction until final termination of such proceedings, and any judgment resulting there from shall be assumed by this jurisdiction.

1.9.4 These Provisions shall not be construed to relieve from or lessen the responsibility of any person owning, operating, or controlling any building or structure for any damages to persons or property caused by defects, nor shall the code enforcement agency or its parent jurisdiction be held as assuming any such liability by reason of the inspections authorized by these Provisions or any permits or certificates issued under these Provisions.

1.10 Appeals

1.10.1 The procedures given in the regulations of AHJ regarding appeals, hearing of appeals, duration and their decisions shall be followed.

1.10.2 The appeal shall be heard shall be heard by a committee constituted by the next higher body above AHJ having members with relevant experience, who are registered with PEC, PCATP or AHJ.

1.11 Records and Reports

1.11.1 A record of examinations, approvals, equivalencies, and alternates shall be maintained by AHJ and shall be available for public inspection during business hours in accordance with applicable laws.

1.11.2 AHJ shall keep a record of all fire prevention inspections, including the date of such inspections and a summary of any violations found to exist, the date of the services of notices, and a record of the final disposition of all violations.

1.11.3 Emergency Response Records

1.11.3.1 The fire department shall keep a record of fire and other emergency responses occurring within its jurisdiction and of facts concerning the same, including statistics as to the extent and damage caused by such fires or emergencies.

1.11.3.2 The fire department shall report its incident record data, collected in accordance with Section 1.11.3, to AHJ.

1.11.4 All records required to be kept shall be maintained until their usefulness has been served or as required by law.

1.12 Permits and Approvals

1.12.1 AHJ shall be authorized to establish and issue permits, certificates, and approvals pertaining to conditions, operations, or materials hazardous to life or property pursuant to Section 1.12.

1.12.2 Applications for permits shall be made to AHJ on prescribed forms provided by AHJ and shall include the applicant's answers in full to inquiries set forth on such forms.

1.12.2.1 Applications for permits shall be accompanied by such data as required by AHJ and fees as required by the jurisdiction.

1.12.2.2 AHJ shall review all applications submitted and issue permits as required.

1.12.2.3 If an application for a permit is rejected by AHJ, the applicant shall be advised of the reasons for such rejection.

1.12.2.4 Permits for activities requiring evidence of financial responsibility by the jurisdiction shall not be issued unless proof of required financial responsibility is furnished.

1.12.3 Conditions of Approval

1.12.3.1 Any conditions of the initial approval by AHJ of a use, occupancy, permit, or construction shall remain with the use, occupancy, permit, or construction unless modified by AHJ.

1.12.3.2 AHJ shall be permitted to require conditions of approval for memorialized via recording in the public records, as part of the plan, map or chart of a piece of land with actual or proposed features, permit, or other method as approved by AHJ.

1.12.4 Approvals by Other AHJs

1.12.4.1 AHJ shall have the authority to require evidence to show that other regulatory agencies having jurisdiction over the design, construction, alteration, repair, equipment, maintenance, process, and relocation of structures have issued appropriate approvals.

1.12.4.2 AHJ shall not be held responsible for enforcement of the provisions of such other regulatory agencies unless specifically mandated to enforce those agencies' provisions.

1.12.5 Misrepresentation

1.12.5.1 Any attempt to misrepresent or otherwise deliberately or knowingly design; install; service; maintain; operate; sell; represent for sale; falsify records, reports, or applications; or other related activity in violation of the requirements prescribed by these Provisions shall be a violation of these Provisions.

1.12.5.2 Such violations shall be cause for immediate suspension or revocation of any related approvals, certificates, or permits issued by AHJ.

1.12.5.3 Such violations shall be subject to any other criminal or civil penalties as available by the laws of this jurisdiction.

1.12.6 Permits

1.12.6.1 A permit shall be predicated upon compliance with the requirements of these Provisions and shall constitute written authority issued by AHJ to maintain, store, use, or handle materials; to conduct processes that could produce conditions hazardous to life or property; or to install equipment used in connection with such activities.

1.12.6.2 Any permit issued under these Provisions shall not take the place of any other approval, certificate, license, or permit required by other provisions or laws of this jurisdiction.

1.12.6.3 Where additional permits, approvals, certificates, or licenses are required by other agencies, approval shall be obtained from those other agencies.

1.12.6.4 AHJ shall have the authority to require an inspection prior to the issuance of a permit.

1.12.6.5 A permit issued under these Provisions shall continue until revoked or for the period of time designated on the permit.

1.12.6.6 The permit shall be issued to one person or business only and for the location or purpose described in the permit.

1.12.6.7 Any change that affects any of the conditions of the permit shall require a new or amended permit.

1.12.6.8 AHJ shall have the authority to grant an extension of the permit time period upon presentation by the permitted of a satisfactory reason for failure to start or complete the work or activity authorized by the permit.

1.12.6.9 A copy of the permit shall be posted or otherwise readily accessible at each place of operation and shall be subject to inspection as specified by AHJ.

1.12.6.10 Any activity authorized by any permit issued under these Provisions shall be conducted by the permittee or the permittee's agents or employees in compliance with all requirements of these Provisions applicable thereto and in accordance with the approved plans and specifications.

1.12.6.11 No permit issued under these Provisions shall be interpreted to justify a violation of any provision of these Provisions or any other applicable law or regulation.

1.12.6.12 Any addition or alteration of approved plans or specifications shall be approved in advance by AHJ, as evidenced by the issuance of a new or amended permit.

1.12.6.13 Permits shall be issued by AHJ in accordance with the regulations/bye-laws of AHJ.

1.12.6.14 Any application for, or acceptance of, any permit requested or issued pursuant to these Provisions shall constitute agreement and consent by the person making the application or accepting the permit to allow AHJ to enter the premises at any reasonable time to conduct such inspections as required by these Provisions.

1.12.7 Revocation or Suspension of Permits

1.12.7.1 AHJ shall be permitted to revoke or suspend a permit or approval issued if any violation of these Provisions is found upon inspection or in case any false statements or misrepresentations have been submitted in the application or plans on which the permit or approval was based.

1.12.7.2 Revocation or suspension shall be constituted when the permittee is duly notified by AHJ.

1.12.7.3 Any person who engages in any business, operation or occupation, or uses any premises, after the permit issued therefore has been suspended or revoked pursuant to the provisions of these Provisions, and before such suspended permit has been reinstated or a new permit issued, shall be in violation of these Provisions.

1.12.7.4 Permits shall be required in accordance with Table 1.12.8(a) through Table 1.12.8(d).

Table 1.12.8(a) Permit Requirements

Operations and Materials	Permit Required	Cross Reference Section Number
Automatic fire suppression systems	For installation, modification, or removal from service of any automatic fire suppression system	9.1.1.1
Candles, open flames, and portable cooking	To use in connection with assembly areas, dining areas of restaurants, or drinking establishments	14.1.1.1
Carnivals and fairs	To conduct a carnival or fair	6.14.1
Covered mall buildings	Annual requirement for facilities that utilize mall area for exhibits or displays with 4 conditions	14.1.5.5.1
Fire alarm and detection systems and related equipment	For installation, modification, or removal from service of any fire alarm and detection systems and related equipment'	9.1.1.1
Fire apparatus access roads	For the construction of a fire apparatus access road	12.1.2
Fire hydrants and water-con roll valves	To use a fire hydrant or operate a water-control valve intended for fire suppression purposes	9.1.1.1

Fire pumps and related equipment	For installation of, modification to, or removal from service of any fire pumps .jockey pumps, controllers, and generators	9.1.1.1
Membrane structures, tents and canopies - permanent	For construction, location, erection, or placement	15.1.2
Membrane structures, tents, and canopies - temporary	To erect or operate an air-supported temporary membrane structure or tent having an area in excess of 200 ft^2 (18.6 m^2) or a canopy in excess of 400 ft^2 (37.2 m^2) *Exception: Temporary membrane structures, tents, or canopy structures used exclusively for camping.*	15.1.2
Open burning	1. To conduct open burning 2. For additional permit requirements for open burning, see 6.10.1	6.10.1
Open fires	I. For kindling or maintaining an open fire 2. For additional permit requirements for open fires, see 6.10.1†	6.10.1
Places of assembly	To operate a place of assembly	6.16.1; 14.1.1.1
Private fire hydrants	For installation, modification. or removal from service of any private fire hydrants	9.1.1.1
Standpipe systems	For installation, modification, or removal from service of any standpipe system*	9.1.1.1
Special outdoor events	For the location and operation of special outdoor events	6.14.1
Water supply system for fire flow	For the construction of a water supply system for fire flow	12.1.2

* Maintenance performed in accordance with these Provisions is not considered a modification and does not require a permit.

†Cooking and recreational fires are exempt and do not require a permit, unless specified otherwise.

Table 1.12.8(b) Permit Amounts for Compressed Gases

	Amount	
Types of Gas	**ft^3**	**m^3**
Corrosive	200	0.57
Flammable	200	0.57
Highly toxic	Any amount	
Inert and simple asphyxiant	6000	169.9
Oxidizing (including oxygen)	504	14.3
Pyrophoric	Any amount	
Toxic	Any amount	
Unstable (reactive)	Any amount	

Table 1.12.8(c) Permit Amounts for Cryogens

Types of Cryogen	**Inside building (gal)**	**Outside building (gal)**
Corrosive	Over 1	Over 1
Flammable	Over 1	60
Toxic /Highly toxic	Over 1	Over 1
Nonflammable	60	500
Oxidizer (includes Oxygen)	10	50

Table 1.12.8(d) Permit Amounts for Hazardous Materials

Amount		
Type of Material	U.S. Unit	Metric Unit
Cellulose nitrate	25 lb	11.3 kg
Combustible fiber	100 ft^3	2.8 m^3
Combustible liquids	*See Table 1.12.8(a)*	
Corrosive gases	*See Table 1.12.8(b)*	
Corrosive liquids	55 gal	208 L
Corrosive solids 5	00 lb	227 kg
Cryogens	*See Table 1.12.8(c)*	
Display fireworks (1.3G)	Any amount	
Explosives	Any amount	
Flammable gases	*See Table 1.12.8(b)*	
Flammable liquids	*See Table 1.12.8(a)*	
Flammable solids	100 lb	45.4 kg
Highly toxic gases	*See Table 1.12.8(b)*	
Highly toxic liquids	Any amount	
Highly toxic solids	Any amount	
LP-Gas	*See Table 1.12.8(b)*	
Nitrate film (cellulose)	Any amount	
Organic peroxides:	*See Table 1.12.8(a)*	
Class I	Any amount	
Class II	Any amount	
Class III	10 lb	4.5 kg
Class IV	20 lb	9 kg
Class V	Not required	
Unclassified detonable	Any amount	
Oxidizing gases	*See Table 1.12.8(b)*	
Oxidizing liquids:	*See Table 1.12.8(a)*	
Class 4	Any amount	
Class 3	1 gal	3.8 L
Class 2	10 gal	38 L
Class 1	55 gal	208 L
Oxidizing solids:	*See Table 1.12.8(a)*	
Class 4	Any amount	
Class 3	10 lb	4.5 kg
Class 2	100 lb	45 kg
Class 1	500 lb	227 kg
Pyrophoric gases	*See Table 1.12.8(b)*	

Pyrophoric liquids	Any amount	
Pyrophoric solids	Any amount	
Toxic gases	*See Table 1.12.8(b)*	
Toxic liquids	10 gal	38 L
Toxic solids	100 lb	45 kg
Unstable (reactive) gases	*See Table 1.12.8(b)*	
Unstable (reactive) liquids:		
Class 4	Any amount	
Class 3	Any amount	
Class 2	5 gal	19 L
Class 1	10 gal	38 L
Unstable (reactive) solids:		
Class 4	Any amount	
Class 3	Any amount	
Class 2	50 lb	22.7 kg
Class 1	100 lb	45 kg
Water reactive liquids:		
Class 3	Any amount	
Class 2	5 gal	19 L
Class 1	10 gal	38 L
Water reactive solids:		
Class 3	Any amount	
Class 2	50 lb	22.7 kg
Class 1	100 lb	45 kg

1.13 Certificates of Fitness/Authorization

1.13.1 Authorization. AHJ shall have the authority to require certificates of fitness and collect fees for individuals or companies performing any of the following activities:

(1) Inspection, servicing, or recharging of portable fire extinguishers

(2) Installation, servicing, modification, or recharging of fixed fire extinguishing systems

(3) Installation, servicing, or modification of fire alarm or fire communication systems

(4) Installation, modification, or servicing of gas- or oil burning heating systems

(5) Chimney sweep operations

(6) Installation, inspection, servicing, or modification of range-hood systems

(7) Installation or servicing of private fire service mains and their appurtenances

(8) Crowd management services required by these Provisions

(9) Utilization of pyrotechnics before a proximate audience

(10) Installation, modification, or maintenance of liquefied petroleum gas or liquefied natural gas tanks or systems

(11) Installation or modification of medical gas systems where a permit is required by Table 1.12.8(a)

(12) Installation, modification, or maintenance of standpipe systems

(13) Installation, modification, or maintenance of automatic sprinkler systems

(14) Installation, modification, or maintenance of fire pumps

(15) Installation, modification, or maintenance of tanks, wells, or drafting points used for fire protection water supplies.

1.13.2 AHJ shall be responsible for the issuance of certificates of fitness.

1.13.3 All applications for a certificate of fitness shall be filed with AHJ on the prescribed forms.

1.13.4 Certification of Applicant

1.13.4.1 Every individual or company applying for a certificate of fitness shall furnish to AHJ evidence of a familiarity with applicable codes, provisions, standards, listings, guidelines, and construction and safety practices for the activity for which the certificate of fitness is issued.

1.13.4.2 AHJ shall also utilize certification programs provided by national organizations acceptable to AHJ, where available, to determine evidence of compliance with 1.13.4.1.

1.13.4.3 AHJ shall investigate every application for a certificate of fitness.

1.13.4.4 The investigation shall include an examination of the applicant's experience and training in the field of the certificate of fitness for which application has been made.

1.13.4.5 When AHJ determines that an applicant is not fit to receive the certificate of fitness because of the applicant's inability to comply with the provisions of these Provisions, AHJ shall refuse to issue the certificate of fitness.

1.13.4.6 If the refusal is based on the applicant's inability to pass an examination given to determine competency, the applicant shall not be permitted to apply again for the certificate of fitness within a 10-day period following the examination.

1.13.5 Certificates of fitness shall not be transferable.

1.13.6 Certificates of fitness shall be issued for the period of time as indicated on the certificate of fitness as determined by AHJ, but such period of time shall not exceed 3 years.

1.13.7 Applications for renewal of a certificate of fitness shall be filed in the same manner as an application for an original certificate.

1.13.8 Each individual or company holding a certificate of fitness shall notify AHJ in writing of any address change within 10 days after such change.

1.13.9 A certificate of fitness shall be in the form of an identification card. The card shall contain the following information:

(1) Purpose for which the certificate of fitness is issued

(2) Date of expiration

(3) Information necessary to easily identify the individual to whom the certificate of fitness is issued

(4) Signature of the individual to whom the certificate of fitness is issued

(5) Name and signature of AHJ or a designated representative

(6) Statement printed thereon in bold type the following:

THIS CERTIFICATE IS NOT AN ENDORSEMENT OF THIS INDIVIDUAL OR COMPANY BY THE AUTHORITY HAVING JURISDICTION.

1.13.10 Any individual or company to whom a certificate of fitness has been granted shall, upon request, produce and show proper identification and the certificate of fitness to anyone for whom that individual seeks to render services or to AHJ.

1.13.11 Revocation or Suspension of Certificates of Fitness

1.13.11.1 AHJ shall be permitted to revoke or suspend a certificate of fitness issued if any violation of these Provisions is found upon inspection or where any false statements or misrepresentations are submitted in the application on which the approval was based.

1.13.11.2 Revocation or suspension shall be constituted when notification is served, posted, or mailed to the address of record for the certificate holder.

1.13.11.3 Failure on the part of an individual to give such notification of a change of address required by 1.13.8 shall constitute grounds for revocation of the certificate of fitness.

1.13.11.4 Revocations or suspensions of a certificate of fitness by AHJ are appealable and shall be heard as per procedure provided in these Provisions.

1.14 Plan Review

1.14.1 Where required by AHJ for new construction, modification, or rehabilitation, construction documents, design calculations and shop drawings shall be submitted, reviewed, and approved prior to the start of such work within the stipulated time frame as provided in Section 1.14.

1.14.2 The applicant shall be responsible to ensure that the following conditions are met:

(1) The construction documents include all of the fire protection requirements.

(2) The shop drawings are correct and in compliance with the applicable codes and standards.

(3) The contractor maintains an approved set of construction documents on site.

1.14.3 It shall be the responsibility of AHJ to promulgate rules that cover the following:

(1) Criteria to meet the requirements of Section 1.14

(2) Review of documents and construction documents within established time frames for the purpose of acceptance or providing reasons for non-acceptance.

1.14.4 Review and approval by AHJ shall not relieve the applicant of the responsibility of compliance with these Provisions.

1.14.5 When required by AHJ, revised construction documents or shop drawings shall be prepared and submitted for review and approval to illustrate corrections or modifications necessitated by field conditions or other revisions to approved plans.

1.15 Technical Assistance

1.15.1 AHJ shall require a review by an approved independent third party with expertise in the matter to be reviewed at the submitter's expense.

1.15.2 The independent reviewer shall provide an evaluation and recommend necessary changes of the proposed design, operation, process, or new technology to AHJ.

1.15.3 AHJ shall be authorized to require design submittals to bear the stamp of a registered design professional.

1.15.4 AHJ shall make the final determination as to whether these Provisions have been met.

1.16 Notice of Violations and Penalties

1.16.1 Where Required. Whenever AHJ determines violations of these Provisions, a written notice shall be issued to confirm such findings.

1.16.2 Serving Notice of Violation

1.16.2.1 Any order or notice of violation issued pursuant to these Provisions shall be served upon the owner, operator, occupant, registered agent, or other person responsible for the condition or violation by using the procedure given in the regulations of AHJ.

1.16.3 Destruction or Removal of Notice. The mutilation, destruction, or removal of a posted order or violation notice without authorization by AHJ shall be a separate violation of these Provisions and the penalties in accordance with the regulations of AHJ shall be imposed.

1.16.4 Penalties

1.16.4.1 Any person who fails to comply with these Provisions, fails to carry out an order made pursuant to these Provisions, or violates any condition attached to a permit, approval, or certificate shall be subject to the penalties in accordance with the regulations of AHJ.

1.16.4.2 AHJ shall refuse to issue a completion certificate, if the proposed or completed buildings contravenes or is in any manner inconsistent with the requirements of these Provisions and give direction under the relevant section of these Provisions.

1.16.4.3 Failure to comply with the time limits of an order or notice of violation issued by AHJ shall result in each day that the violation continues being regarded as a separate offense and shall be subject to a separate penalty.

1.16.4.4 A separate notice of violation shall not be required to be served each day for a violation to be deemed a separate offense.

1.16.5 Abatement. Where a violation creates an imminent danger, AHJ is authorized to abate such hazard in accordance with Section 1.7.16.

1.16.6 Fire Design Failure

1.16.6.1 Any failure of the fire design shall be a joint responsibility of consultant, architect, contractor, owner and head of AHJ unless otherwise specific responsibility is fixed through investigations.

Chapter 2 Referenced Publications

2.1 General

The documents referenced in this chapter or portions of such documents are referenced within these Provisions and shall be considered part of the requirements of this document.

(1) Documents referenced in this chapter or portion of such documents shall only be applicable to the extent called for within other chapters of these Provisions.

(2) Where the requirements of a referenced code or standard differ from the requirements of these Provisions, the requirements of these Provisions shall govern.

2.2 NFPA Standards/Codes

NFPA 10, *Standard for Portable Fire Extinguishers,* 2013 edition.

NFPA13, *Standard for the Installation of Sprinkler Systems,* 2013 edition.

NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes,* 2013 edition.

NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies,* 2013 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems,* 2013 edition.

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection,* 2013 edition.

NFPA 22, *Standard for Water Tanks for Private Fire Protection,* 2013 edition.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances,* 2013 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems,* 2014 edition.

NFPA 30, *Flammable and Combustible Liquids Code,* 2015 edition.

NFPA 30B, *Code for the Manufacture and Storage of Aerosol Products,* 2015 edition.

NFPA 31, *Standard for the Installation of Oil-Burning Equipment,* 2011 edition.

NFPA 36, *Standard for Solvent Extraction Plants,* 2013 edition.

NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines,* 2014 edition.

NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Film,* 2011 edition.

NFPA 54, *National Fuel Gas Code,* 2015 edition.

NFPA 58, *Liquefied Petroleum Gas Code,* 2014 edition.

NFPA 61, *Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities,* 2013 edition.

NFPA 70, National Electrical Code, 2014 edition.

NFPA72, National Fire Alarm and Signaling Code, 2013 edition.

NFPA 88A, *Standard for Parking Structures,* 2015 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2015 edition.

NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*, 2015 edition.

NFPA 92, *Standard for Smoke Control Systems*, 2012 edition.

NFPA *101*, *Life Safety Code*, 2015 edition.

NFPA 909, *Code for protection of Cultural Resource, properties, museums, libraries and places of worships*, 2013 edition.

NFPA 110, *Standard for Emergency and Standby Power Systems*, 2013 edition.

NFPA 114, *Code for Fire Protect*ion Historic Structures, 2010 edition.

NFPA 204, *Standard for Smoke and Heat Venting*, 2012 edition.

NFPA 220, *Standard on Types of Building Construction*, 2015 edition.

NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls & Fire Barrier Walls*, 2015 edition.

NFPA 232, *Standard for the Protection of Records*, 2012 edition.

NFPA 400, *Hazardous Materials Code*, 2013 edition.

NFPA 501, *Standard on Manufactured Housing*, 2013 edition.

NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*, 2010 edition.

NFPA 5000, *Building Construction and Safety Code*, 2015 edition.

Other Publications

ASTM D 2859, *Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials*, 2006 (2011).

ASTM E 84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, 2013.

ASTM E 119, *Standard Test Methods for Fire Tests of Building Construction and Materials.*

ASTM E 814, *Standard Test Method for Fire Tests of Through-Penetration Fire Stops*, 2011a.

ASTM E 1537, *Standard Test Method for Fire Testing of Upholstered Furniture*, 2012.

ASTM E 1590, *Standard Test Method for Fire Testing of Mattresses*, 2012.

ASTM E 1966, *Standard Test Method for Fire-Resistive Joint Systems*, 2007 (2011).

ASTM E 2307, *Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus*, 2010.

UL 263, *Standard for Fire Tests of Building Construction and Materials.*

ANSI/UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*, 2008, Revised 2010.

UL 1479, *Standard for Fire Tests of Through-Penetration Firestops*,2003, Revised 2010.

UL 2079, *Standard for Tests for Fire Resistance of Building Joint Systems*, 2004, Revised 2008.

Chapter 3 Definitions

3.1 General

The definitions contained in this chapter shall apply to the terms used in these Provisions. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 Provisions Official Definitions

3.2.1 Approved. Acceptable to AHJ.

3.2.2 Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of these Provisions, or for approving equipment, materials, an installation, or a procedure. AHJ shall be the following, whichever has jurisdiction and circle:

1. Building Control, Housing and Development Authorities
2. District Administration
3. Tehsil or Town Administration
4. Municipal Administration
5. Station Headquarters (Army, Air Force and Navy)
6. Cantonment Administration
7. Union Council Administration
8. Autonomous Bodies
9. Industrial Estates
10. Directorates of Civil Defense
11. Export Processing Zones
12. Other Federal/Provincial Authorities as and when notified

3.2.3 Provisions. A standard that is an extensive compilation of fire protection and prevention clauses covering broad subject matter or that is suitable for adoption into law independently of other provisions, codes and standards.

3.2.4 Guide. A document that is advisory or informative in nature and that contains only no mandatory provisions. A guide may contain mandatory statements such as when a guide can be used, but the document as a whole is not suitable for adoption into law.

3.2.5 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to AHJ and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.6 Listed/approved. Equipment, materials, or services included in a list published by an organization that is acceptable to AHJ and concerned with evaluation of products or services,

that maintains periodic inspection of production of listed/approved equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.7 Recommended Practice. A document that is similar in content and structure to a code or standard but that contains only non-mandatory provisions using the word "should" to indicate recommendations in the body of the text.

3.2.8 Shall. Indicates a mandatory requirement.

3.2.9 Should. Indicates a recommendation or that which is advised but not required.

3.2.10 Standard. A document, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Non mandatory provisions shall be located in an appendix or annex, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

3.3 General Definitions

3.3.1 Absolute Pressure. Pressure based on a zero reference point, the perfect vacuum.

3.3.2 Access Box. An approved secure box, accessible by AHJ's master key or control, containing entrance keys or other devices to gain access to a structure or area.

3.3.3 Addition. An increase in building area, aggregate floor area, building height or number of stories of a structure.

3.3.4 Aerosol Product. A combination of a container, a propellant, and a material that is dispensed.

3.3.5 Aisle Width. The horizontal dimension between the face of the loads in racks under consideration.

3.3.6 Alarm. A warning of danger.

3.3.7 Alarm Signal. A signal that results from the manual or automatic detection of an alarm condition.

3.3.8 Alcohol-Based Hand Rub. An alcohol-containing preparation designed for application to the hands for reducing the number of visible microorganisms on the hands and containing ethanol or isopropanol in an amount not exceeding 95 percent by volume.

3.3.9 Alleyway. An accessible clear space between storage piles or groups of piles suitable for housekeeping operations, visual inspection of piling areas, and initial firefighting operations.

3.3.10 Alternative. A system, condition, arrangement, material, or equipment submitted to AHJ as a substitute for a requirement in a standard.

3.3.11 Area

3.3.11.1 ***Back Stock Area.*** The area of a mercantile occupancy that is physically separated from the sales area and not intended to be accessible to the public.

3.3.11.2 ***Control Area.*** A building or portion of a building or outdoor area within which hazardous materials are allowed to be stored, dispensed, used, or handled in quantities not exceeding the maximum allowable quantities (MAQ).

3.3.11.3 ***Fire Area.*** An area of a building separated from the remainder of the building by construction having a fire resistance of at least 1 hour and having all communicating openings properly protected by an assembly having a fire resistance rating of at least 1 hour.

3.3.11.4 ***Fire Flow Area.*** The floor area, in square feet, used to determine the required fire flow.

3.3.11.5 ***Indoor Area.*** An area that is within a building or structure having overhead cover, other than a structure qualifying as "weather protection".

3.3.11.6 ***Inside Liquid Storage Area.*** A room or building used for the storage of liquids in containers or portable tanks, separated from other types of occupancies.

3.3.11.7 ***Organic Peroxide Storage Area.*** An area used for the storage of organic peroxide formulations.

3.3.11.8 ***Outdoor Area.*** An area that is not an indoor area.

3.3.11.9 ***Permissible Areas***

3.3.11.9.1 ***Designated Area.*** A specific location designed and approved for hot work operations that is maintained fire safe such as a maintenance shop or a detached outside location that is of noncombustible or fire-resistive construction, essentially free of combustible and flammable contents, and suitably segregated from adjacent areas.

3.3.11.9.2 ***Permit-Required Area.*** Any location other than a designated area that is approved for hot work. A permit required area is an area that is made fire safe by removing or protecting combustibles from ignition sources.

3.3.11.10 ***Sales Display Area.*** The area of a mercantile occupancy that is open to the public for the purpose of viewing and purchasing goods, wares, and merchandise. Individuals are free to circulate among the items, which are typically displayed on shelves, on racks, or on the floor.

3.3.11.11 ***Smoking Area.*** A designated area where smoking is permitted within a premises in which smoking is otherwise generally prohibited.

3.3.11.12 ***Spray Area.*** Any fully enclosed, partly enclosed, or unenclosed area in which dangerous quantities of flammable or combustible vapors, mists, residues, dusts, or deposits are present due to the operation of spray processes, including

(1) any area in the direct path of a spray application process;

(2) the interior of a spray booth or spray room or limited finishing workstation, as herein defined; (3) the interior of any exhaust plenum, eliminator section, or scrubber section;

(4) the interior of any exhaust duct or exhaust stack leading from a spray application process;

(5) the interior of any air recirculation filter house or enclosure, including secondary recirculation particulate filters;

(6) Any solvent concentrator (pollution abatement) unit or solvent recovery (distillation) unit.

The following shall not be considered part of the spray area:

(1) Fresh air make-up units;

(2) Air supply ducts and air supply plenums;

(3) Recirculation air supply ducts downstream of secondary filters;

(4) Exhaust ducts from solvent concentrator (pollution abatement) units.

3.3.12 ASME. American Society of Mechanical Engineers.

3.3.13 ASME Container (or Tank). A container as herein defined, so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

3.3.14 ASTM. American Society for Testing and Materials, now known as "ASTM International."

3.3.15 Automatic Emergency Shutoff Valve. A designated failsafe automatic closing valve designed to shut off the flow of gases or liquids that is initiated by a control system where the control system is activated by either manual or automatic means.

3.3.16 Available Height for Storage. The maximum height at which commodities can be stored above the floor and still maintain necessary clearance from structural members and the required clearance below sprinklers.

3.3.17 Baled Cotton. A natural seed fiber wrapped and secured in industry-accepted materials, usually consisting of burlap, woven polypropylene, 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).

3.3.17.1 ***Block.*** A basic yard storage unit for baled cotton comprising multiple-row storage with clear spaces on all sides.

3.3.17.2 ***Densely Packed Baled Cotton.*** Cotton, made into banded bales, with a packing density of at least 22 lb/ft^3 (360 kg/m^3), and dimensions complying with the following: a length of 55 in. (ca. 1400 mm ± 20 mm), a width of 21 in. (ca. 530 mm ± 20 mm), and a height of 27.6 in. to35.4 in. (700 mm to 900 mm).

3.3.17.3 ***Fire-Packed Baled Cotton.*** A cotton bale within which a fire has been packed as a result of a process in which ginning is the most frequent cause.

3.3.17.4 ***Naked Cotton Bale.*** An unwrapped cotton bale secured with wire or steel straps.

3.3.18 Barrel. A unit of volume used in the petroleum industry that is equal to 42 gal (159 L).

3.3.19 Basement. Any story of a building wholly or partly below grade plane that is not considered the first story above grade plane.

3.3.20 Battery System. A system that consists of these interconnected subsystems: (1) stationary storage batteries, (2) battery chargers, and (3) a collection of rectifiers, inverters, converters, and associated electrical equipment as required for particular application.

3.3.21 Battery Types, Stationary

3.3.21.1 ***Lithium-Ion Battery.*** A storage battery that consists of lithium ions imbedded in a carbon graphite or nickel metal-oxide substrate. The electrolyte is a carbonate mixture or a gelled polymer. The lithium ions are the charge carriers of the battery.

3.3.21.2 ***Lithium Metal Polymer Battery.*** A storage battery that is comprised of non-aqueous liquid or polymerized electrolytes, which provide ionic conductivity between lithiated positive active material electrically separated from metallic lithium or lithiated negative active material.

3.3.21.3 ***Nickel Cadmium (NiCad) Battery.*** An alkaline storage battery in which the positive active material is nickel oxide, the negative contains the cadmium, and the electrolyte is potassium hydroxide.

3.3.21.4 ***Valve-Regulated (VRLA).*** A lead-acid battery consisting of sealed cells furnished with a valve that opens to vent the battery whenever the internal pressure of the battery exceeds the ambient pressure by a set amount.

3.3.21.5 ***Vented (Flooded).*** A lead-acid battery consisting of cells that have electrodes immersed in liquid electrolyte.

3.3.22 Block. A basic yard storage unit for bale cotton comprising multiple row storage with clear spaces on all sides.

3.3.23 Boiling Point. The temperature at which the vapor pressure of a liquid equals the surrounding atmospheric pressure.

3.3.24 Boil-Over. An event in the burning of certain oils in an open-top tank when, after a long period of quiescent burning, there is a sudden increase in fire intensity associated with expulsion of burning oil from the tank.

3.3.25 Building. Any structure used or intended for supporting or sheltering any use or occupancy.

3.3.25.1 ***Airport Terminal Building.*** A structure used primarily for air passenger enplaning or deplaning, including ticket sales, flight information, baggage handling, and other necessary functions in connection with air transport operations. This term includes any extensions and satellite buildings used for passenger handling or aircraft flight service functions. Aircraft loading walkways and "mobile lounges" are excluded.

3.3.25.2 ***Apartment Building.*** See 3.3.157.1.

3.3.25.3 ***Attached Building.*** A building having only one common wall with another building having other types of occupancies.

3.3.25.4 ***Bulk Merchandising Retail Building.*** See 3.3.157.3.

3.3.25.5 ***Existing Building.*** A building erected or officially authorized prior to the effective date of the adoption of this edition of these Provisions by the agency or jurisdiction.

3.3.25.6 ***High-Rise Building.*** A structure that is taller than 18 m (60 ft) from ground and is served with vertical transportation.

3.3.25.7 ***Important Building.*** A building that is considered not expendable in an exposure fire.

3.3.25.8 ***Special Amusement Building.*** A building that is temporary, permanent, or mobile and 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 due to the mode of conveyance through the building or structure.

3.3.25.9 ***Storage Tank Building.*** A three-dimensional space that is enclosed by a roof and walls that cover more than one-half of the possible area of the sides of the space, is of sufficient size to allow entry by personnel, will likely limit the dissipation of heat or dispersion of vapors, and restricts access for firefighting.

3.3.26 Bulk Plant or Terminal. That portion of a property where 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.

3.3.27 Burn-It. Afire-fighting strategy that allows for the free burn of a tire fire.

3.3.28 Bury-It. Afire-fighting strategy in which a tire pile is buried with soil, sand, gravel, cement dust, or other cover material.

3.3.29 Cathodic Protection. A technique to resist the corrosion of a metal surface by making the surface the cathode of an electrochemical cell.

3.3.30 Cathodic Protection Tester. A person who demonstrates an understanding of the principles and measurements of all common types of cathodic protection systems applicable to metal piping and container systems and who has education and experience in soil resistivity, stray current, structure-to-soil potential, and component electrical isolation measurements of metal piping and container systems.

3.3.31 Certificate of Fitness. A written document issued by AHJ to any person for the purpose of granting permission to such person to conduct or engage in any operation or act for which certification is required.

3.3.32 Chemical Heat of Combustion (*Hc*). The amount of heat released, in Btu/lb. (kJ/g), when a substance is oxidized to yield stable end products, including water as a vapor, as measured under actual fire conditions in a normal ambient (air) atmosphere.

3.3.33 Chemical Name. The scientific designation of alchemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry or the Chemical Abstracts Service rules of nomenclature, or a name that clearly identifies a chemical for the purpose of conducting an evaluation.

3.3.34 Chemical Plant. A large integrated plant or that portion of such a plant, other than a refinery or distillery, where liquids are produced by chemical reactions or used in chemical reactions.

3.3.35 Chip. A wood chip of various species used in the manufacture of pulp.

3.3.36 Cleaning Media. Materials used to clean piping systems.

3.3.37 Clean Zone. A defined space in which the concentration of airborne particles is controlled to specified limits.

3.3.38 Cleanroom. A room in which the concentration of airborne particles is controlled to specified limits, including areas below the raised floor and above the ceiling grid if these areas are part of the air path and within the rated construction.

3.3.39 Clear Space. An area free of combustible materials but that can contain noncombustible materials that cannot transmit an exposure fire.

3.3.40 Closed-Top Diking. A dike with a cover intended to minimize the entrance of precipitation into the diked area.

3.3.41 Clothes Dryer. A device used to dry wet laundry by means of heat derived from the combustion of fuel or from electric heating elements.

3.3.42 Code

3.3.42.1 *Building Code.* The building or construction code adopted by AHJ.

3.3.42.2 *Electrical Code.* The electrical code referenced in Chapter 2.

3.3.42.3 *Mechanical Code.* The mechanical or mechanical construction code adopted by AHJ.

3.3.43 Cold Deck. A single ranked pile of logs with individual logs of regular or irregular length usually 20-50 ft (6.1-15.2 m) long, but greater than 8 ft (2.4 m) long.

3.3.44 Column (Paper). A single vertical stack of rolls of paper.

3.3.45 Combustible (Material). A material that, in the form in which it is used and under the conditions anticipated, will ignite and burn; a material that does not meet the definition of noncombustible or limited-combustible.

3.3.46 Combustible Dust. A finely divided combustible particulate solid that presents a flash fire hazard or explosion hazard when suspended in air or the process-specific oxidizing medium over a range of concentrations.

3.3.47 Combustible Fiber. Any material in a fibrous or shredded form that readily ignites when heat sources are present.

3.3.48 Combustible Refuse. All combustible or loose rubbish, litter, or waste materials generated by an occupancy that are refused, rejected, or considered worthless and are disposed of by incineration on the premises where generated or periodically transported from the premises.

3.3.49 Combustible Waste. Combustible or loose waste material that is generated by an establishment or process and, if salvageable, is retained for scrap or reprocessing on the premises where generated or transported to a plant for processing.

3.3.50 Combustion. A chemical process of oxidation that occurs at a rate fast enough to produce heat and usually light in the form of either a glow or flame.

3.3.51 Commodity. The combination of products, packing material, and container that determines commodity classification.

3.3.52 Common Path of Travel. The portion of exit access that must be traversed before two separate and distinct paths of travel to two exits are available.

3.3.53 Compartment

3.3.53.1 ***Fire Compartment.*** A space within a building that is enclosed by fire barriers on all sides, including the top and bottom.

3.3.53.2 ***Smoke Compartment.*** A space within a building enclosed by smoke barriers on all sides, including the top and bottom.

3.3.54 Construction Documents. Documents that consist of scaled design drawings and specifications for the purpose of construction of new facilities or modification to existing facilities.

3.3.55 Container. A vessel, including cylinders, tanks, portable tanks, and cargo tanks, used for transporting or storing materials.

3.3.55.1 ***Closed Container.*** A container as herein defined, so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

3.3.55.2 ***Compressed Gas Container.*** A pressure vessel designed to hold compressed gas at an absolute pressure greater than 1 atmosphere at 68°F (20°C) that includes cylinders, containers, and tanks.

3.3.55.3 ***Container (Flammable or Combustible Liquid).*** Any vessel of 119 gal (450 L) or less capacity used for transporting or storing liquids.

3.3.55.4 ***Cryogenic Fluids Container.*** A cryogenic vessel used for transportation, handling, or storage.

3.3.55.5 ***Intermediate Bulk Container.*** Any closed vessel having a liquid capacity not exceeding 3000 L (793 gal) and intended for storing and transporting liquids.

3.3.55.6 ***[LP-Gas] Container.*** Any vessel, including cylinders, tanks, portable tanks, and cargo tanks, used for the transporting or storing of LP-Gases.

3.3.56 Conventional Pallets. A material-handling aid designed to support a unit load with openings to provide access for material-handling devices.

3.3.57 Cooking Fire. The noncommercial, residential burning of materials not exceeding 3 ft (0.9 m) in diameter and 2 ft (0.6 m) in height, other than rubbish in which the fuel burned is contained in an outdoor fireplace, a barbecue grill, or a barbecue pit for the purpose of preparing food.

3.3.58 Cordwood. Logs 8 ft (2.4 m) or less in length customarily intended for pulpwood or fuel uses.

3.3.59 Core. The central tube around which paper is wound to form a roll.

3.3.60 Crude Petroleum. Hydrocarbon mixtures that have a flash point below 150°F (65.6°C) and that have not been processed in a refinery.

3.3.61 Cryogenic Fluid. A fluid with a boiling point lower than –130°F (–90°C) at an absolute pressure of 14.7 psi (101.3 kPa).

3.3.61.1 ***Flammable Cryogenic Fluid.*** A cryogenic fluid that forms flammable mixtures in air when in its vapor state.

3.3.61.2 ***Inert Cryogenic Fluid.*** A cryogenic fluid that vaporizes to produce an inert gas when in its vapor state.

3.3.61.3 ***Oxidizing Cryogenic Fluid.*** An oxidizing gas in the cryogenic state.

3.3.62 Cultural Resource Properties. Buildings, structures, or sites, or portions thereof, that are culturally significant, or that house culturally significant collections.

3.3.63 Cylinder. A pressure vessel designed for absolute pressures higher than 40 psi (276 kPa) and having a circular cross section. It does not include a portable tank, multiunit tank car tank, cargo tank, or tank car.

3.3.64 Cylinder 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.

3.3.65 Cylinder Pack. An arrangement of cylinders into a cluster where the cylinders are confined into a grouping or arrangement with a strapping or frame system and connections are made to a common manifold. The frame system is allowed to be on skids or wheels to permit movement.

3.3.66 Damage-Limiting Construction. For the purposes of these Provisions, any set of construction elements, used individually or in combination, which will act to limit damage from an explosion, including open structures, pressure relieving construction, or pressure resistant construction.

3.3.67 Deflagration. Propagation of a combustion zone at a velocity that is less than the speed of sound in the unreacted medium.

3.3.68 Detector. A device suitable for connection to a circuit that has a sensor that responds to a physical stimulus such as gas, heat or smoke.

3.3.68.1 ***Air Sampling–Type Detector.*** A detector that consists of a piping or tubing distribution network that runs from the detector to the area(s) to be protected. An aspiration fan in the detector housing draws air from the protected area back to the detector through air sampling ports, piping, or tubing. At the detector, the air is analyzed for fire products.

3.3.68.2 ***Automatic Fire Detector.*** A device designed to detect the presence of a fire signature and to initiate action. For the purpose of these Provisions, automatic fire detectors are classified as follows: Automatic Fire Extinguishing or Suppression System Operation Detector, Fire–Gas Detector, Heat Detector, Other Fire Detectors, Radiant Energy–Sensing Fire Detector, and Smoke Detector.

3.3.68.3 ***Automatic Fire Extinguishing or Suppression System Operation Detector.*** A device that automatically detects the operation of a fire extinguishing or suppression system by means appropriate to the system employed.

3.3.68.4 ***Combination Detector.*** A device that either responds to more than one of the fire phenomena or employs more than one operating principle to sense one of these phenomena. Typical examples are a combination of a heat detector with a smoke detector or a combination rate of-rise and fixed-temperature heat detector. This device has listings for each sensing method employed.

3.3.68.5 ***Electrical Conductivity Heat Detector.*** A line-type or spot-type sensing element in which resistance varies as a function of temperature.

3.3.68.6 ***Fire–Gas Detector.*** A device that detects gases produced by a fire.

3.3.68.7 ***Fixed-Temperature Detector.*** A device that responds when it's operating element becomes heated to a predetermined level.

3.3.68.8 ***Flame Detector.*** A radiant energy–sensing fire detector that detects the radiant energy emitted by a flame.

3.3.68.9 ***Gas Detector.*** A device that detects the presence of a specified gas concentration. Gas detectors can be either spot-type or line-type detectors.

3.3.68.10 ***Heat Detector.*** A fire detector that detects either abnormally high temperature or rate of temperature rise, or both.

3.3.68.11 ***Line-Type Detector.*** A device in which detection is continuous along a path. Typical examples are rate-of-rise pneumatic tubing detectors, projected beam smoke detectors, and heat-sensitive cable.

3.3.68.12 ***Multi-Criteria Detector.*** A device that contains multiple sensors that separately respond to physical stimulus such as heat, smoke, or fire gases, or employs more than one sensor to sense the same stimulus. This sensor is capable of generating only one alarm signal from the sensors employed in the design either independently or in combination. The sensor output signal is mathematically evaluated to determine when an alarm signal is warranted. The evaluation can be performed either at the detector or at the control unit. This detector has a single listing that establishes the primary function of the detector.

3.3.68.13 ***Multi-Sensor Detector.*** A device that contains multiple sensors that separately respond to physical stimulus such as heat, smoke, or fire gases, or employs more than one sensor to sense the same stimulus. A device capable of generating multiple alarm signals from any one of the sensors employed in the design, independently or in combination. The sensor output signals are mathematically evaluated to determine when an alarm signal is warranted. The evaluation can be performed either at the detector or at the control unit. This device has listings for each sensing method employed.

3.3.68.14 ***Other Fire Detectors.*** Devices that detect a phenomenon other than heat, smoke, flame, or gases produced by a fire.

3.3.68.15 ***Pneumatic Rate-of-Rise Tubing Heat Detector.*** A line-type detector comprising small-diameter tubing, usually copper, that is installed on the ceiling or high on the walls

throughout the protected area. The tubing is terminated in a detector unit containing diaphragms and associated contacts set to actuate at a predetermined pressure. The system is sealed except for calibrated vents that compensate for normal changes in temperature.

3.3.68.16 ***Projected Beam–Type Detector.*** A type of photoelectric light obscuration smoke detector wherein the beam spans the protected area.

3.3.68.17 ***Radiant Energy–Sensing Fire Detector.*** A device that detects radiant energy, such as ultraviolet, visible, or infrared, that is emitted as a product of combustion reaction and obeys the laws of optics.

3.3.68.18 ***Rate Compensation Detector.*** A device that responds when the temperature of the air surrounding the device reaches a predetermined level, regardless of the rate of temperature rise.

3.3.68.19 ***Rate-of-Rise Detector.*** A device that responds when the temperature rises at a rate exceeding a predetermined value.

3.3.68.20 ***Smoke Detector.*** A device that detects visible or invisible particles of combustion.

3.3.68.21 ***Spark/Ember Detector.*** A radiant energy–sensing fire detector that is designed to detect sparks or embers, or both. These devices are normally intended to operate in dark environments and in the infrared part of the spectrum.

3.3.68.22 ***Spot-Type Detector.*** A device in which the detecting element is concentrated at a particular location. Typical examples are bimetallic detectors, fusible alloy detectors, certain pneumatic rate-of-rise detectors, certain smoke detectors, and thermoelectric detectors.

3.3.69 Detonation. Propagation of a combustion zone at a velocity that is greater than the speed of sound in the unreacted medium.

3.3.70 Dispensing. The pouring or transferring of a material from a container tank, or similar vessel whereby vapors, dusts, fumes, mists, or gases could be liberated to the atmosphere.

3.3.71 Distillery. A plant or that portion of a plant where liquids produced by fermentation are concentrated and where the concentrated products are also mixed, stored, or packaged.

3.3.72 Distributor. A business engaged in the sale or resale, or both, of compressed gases or cryogenic fluids, or both.

3.3.73 Driveway. A clear space suitable for fire-fighting operations by motorized fire apparatus.

3.3.74 Dwelling Unit. One or more rooms arranged for complete, independent housekeeping purposes, with space foresting, living, and sleeping; facilities for cooking; and provisions for sanitation.

3.3.75 Emergency. A fire, explosion, or hazardous condition that poses an immediate threat to the safety of life or damage to property.

3.3.76 Emergency Relief Vent. An opening, construction method, or device that will automatically relieve excessive internal pressure due to an exposure fire.

3.3.77 Emergency Shutoff Valve. A designated valve designed to shut off the flow of gases or liquids.

3.3.78 Ethylene Oxide Drum. For the purposes of these Provisions, containers built to UN specification 1A1.

3.3.79 Excess Flow Control. A fail-safe system or approved means designed to shut off flow due to a rupture in pressurized piping systems.

3.3.80 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 it's predetermined flow is exceeded.

3.3.81 Exhausted Enclosure. An appliance or piece of equipment that consists of a top, a back, and two sides that provides means of local exhaust for capturing gases, fumes, vapors, and mists.

3.3.82 Existing. That which is already in existence on the date this edition of the Code goes into effect.

3.3.83 Existing Condition. Any situation, circumstance, or physical makeup of any structure, premise, or process that was ongoing or in effect prior to the adoption of these Provisions.

3.3.84 Exit. That portion of a means of egress that is separated from all other spaces of a building or structure by construction, location, or equipment as required to provide a protected way of travel to the exit discharge.

3.3.84.1 ***Horizontal Exit.*** A way of passage from one building to an area of refuge in another building on approximately the same level, or a way of passage through or around a fire barrier to an area of refuge on approximately the same level in the same building that affords safety from fire and smoke originating from the area of incidence and areas communicating therewith.

3.3.85 Exit Access. That portion of a means of egress that leads to an exit.

3.3.86 Exit Discharge. That portion of a means of egress between the termination of an exit and a public way.

3.3.87 Explosion. The bursting or rupture of an enclosure or a container due to the development of internal pressure from a deflagration.

3.3.88 Explosion Control. A means of either preventing an explosion through the use of explosion suppression, fuel reduction, or oxidant reduction systems or a means to prevent the structural collapse of a building in the event of an explosion through the use of deflagration venting, barricades, or related construction methods.

3.3.89 Explosive Material. A chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion.

3.3.90 Facility. As applied to access and water supply, a structure or use in a fixed location including exterior storage, use, and handling areas that relates to the occupancies and operations covered by these Provisions.

3.3.91 Fail-Safe. A design arrangement incorporating one or more features that automatically counteracts the effect of an anticipated source of failure or which includes a design arrangement that eliminates or mitigates a hazardous condition by compensating automatically for a failure or malfunction.

3.3.92 Festival Seating. A form of audience/spectator accommodation in which no seating, other than a floor or finished ground level, is provided for the audience/spectators gathered to observe a performance.

3.3.93 Fines (Wood). Small pieces or splinters of wood byproducts that can pass through a 0.25 in. (6.4 mm) screen.

3.3.94 Finish.

3.3.94.1 ***Interior Ceiling Finish.*** The interior finish of ceilings.

3.3.94.2 ***Interior Finish.*** The exposed surfaces of walls, ceilings, and floors within buildings.

3.3.94.3 ***Interior Floor Finish.*** The interior finish of floors, ramps, stair treads and risers, and other walking surfaces.

3.3.94.4 ***Interior Wall Finish.*** The interior finish of columns, fixed or movable walls, and fixed or movable partitions.

3.3.95 Fires, Classification of

3.3.95.1 ***Class A Fires.*** Class A fires are fires in ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics.

3.3.95.2 ***Class B Fires.*** Class B fires are fires in flammable liquids, combustible liquids, petroleum greases, tars, oils, oil-based paints, solvents, lacquers, alcohols, and flammable gases.

3.3.95.3 ***Class C Fires.*** Class C fires are fires that involve energized electrical equipment.

3.3.95.4 ***Class D Fires.*** Class D fires are fires in combustible metals, such as magnesium, titanium, zirconium, sodium, lithium, and potassium.

3.3.95.5 ***Class K Fires.*** Class K fires are fires in cooking appliances that involve combustible cooking media (vegetable or animal oils and fats).

3.3.96. **Fire recreational.** (See 3.3.188)

3.3.97. Fire alarm system. (See 3.3.218.10)

3.3.98 Fire Department Access Road. The road or other means developed to allow access and operational setup for fire-fighting and rescue apparatus.

3.3.99 Fire Door Assembly. Any combination of a fire door, a frame, hardware, and other accessories that together provide a specific degree of fire protection to the opening.

3.3.100 Fire Flow. The flow rate of a water supply, measured at 20 psi (137.9 kPa) residual pressure that is available for firefighting.

3.3.101 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.

3.3.102 Fire Hydrant. A valve connection on a water supply system having one or more outlets and that is used to supply hose and fire department pumpers with water.

3.3.103 Fire Lane. A fire department access road, which is marked with approved signs or other approved notices.

3.3.104 Fire Point. The lowest temperature at which a liquid will ignite and achieve sustained burning when exposed to a test flame.

3.3.105 Fire Retardant. A liquid, solid, or gas that tends to inhibit combustion when applied on, mixed in, or combined with combustible materials.

3.3.106 Fire Watch. The assignment of a person or persons to an area for the express purpose of notifying the fire department, the building occupants, or both of an emergency; preventing a fire from occurring; extinguishing small fires; or protecting the public from fire or life safety dangers.

3.3.107 Flame Spread. The propagation of flame over a surface.

3.3.108 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.

3.3.109 Flammable Vapors. Flammable vapors are the concentration of flammable constituents in air that exceed 25 percent of their lower flammability limit (LFL).

3.3.110 Flash Point. The minimum temperature of a liquidate which sufficient vapor is given off to form an ignitable mixture with the air, near the surface of the liquid or within the vessel used, as determined by the appropriate test procedure and apparatus.

3.3.111 Floor Area

3.3.111.1 ***Gross Floor Area.*** The floor area within the inside perimeter of the outside walls of the building under consideration with no deduction for hallways, stairs, closets, thickness of interior walls, columns, elevator and building services shafts, or other features, but excluding floor openings associated with atriums and communicating spaces.

3.3.111.2 ***Net Floor Area.*** The floor area within the inside perimeter of the outside walls, or the outside walls and firewalls of the building, or outside and/or inside walls that bound an occupancy or incidental use area requiring the occupant load to be calculated using net floor area under consideration with deductions for hallways, stairs, closets, thickness of interior walls, columns, or other features.

3.3.112 Forecasting. The ability to predict fire progression in a scrap tire storage location prior to the completion of the inventory fire break using heavy equipment.

3.3.113 Fugitive Emissions. Releases of flammable vapor that continuously or intermittently occur from process equipment during normal operations.

3.3.114 Gallon, U.S. Standard. 1 U.S. gal = 0.833 Imperial gal= 231 in.3 = 3.785 L.

3.3.115 Garage. A building or portion of a building in which one or more self-propelled vehicles carrying volatile flammable liquid for fuel or power are kept for use, sale, storage, rental, repair, exhibition, or demonstrating purposes, and all that portion of a building that is on or below the floor or floors in which such vehicles are kept and that is not separated therefrom by suitable cutoffs.

3.3.116 Gas

3.3.116.1 ***Compressed Gas.*** A material, or mixture of materials, that (1) is a gas at 68°F (20°C) or less at 14.7 psi (101.3 kPa) and (2) has a boiling point of 68°F (20°C) or less at 14.7 psi (101.3 kPa) that is liquefied, non-liquefied, or in solution, except those gases that have no other health or physical hazard properties are not considered to be compressed until the pressure in the packaging exceeds an absolute pressure of 40.6 psi (280 kPa) at 68°F (20°C).

3.3.116.1.1 ***Compressed Gas Mixtures.*** 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.

3.3.116.1.2 ***Compressed Gases in Solution.*** Non liquefied gases that are dissolved in a solvent.

3.3.116.1.3 ***Liquefied Compressed Gases.*** Gases that are contained in a packaging under the charged pressure and are partially liquid at a temperature of 68°F (20°C).

3.3.116.1.4 ***Nonliquefied Compressed Gases.*** Gases, other than those in solution, that are contained in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C).

3.3.116.2 ***Corrosive Gas.*** A gas that causes visible destruction of or irreversible alterations in living tissue by chemical action at the site of contact.

3.3.116.3 ***Flammable Gas.*** A material that is a gas at 68°F (20°C) or less at an absolute pressure of 14.7 psi (101.3 kPa), that is ignitable at an absolute pressure of14.7 psi (101.3 kPa) when in a mixture of 13 percent or less by volume with air, or that has a flammable range at an absolute pressure of 14.7 psi (101.3 kPa) with air of at least 12 percent, regardless of the lower limit.

3.3.116.4 ***Flammable Liquefied Gas.*** A liquefied compressed gas that, when under a charged pressure, is partially liquid at a temperature of 68°F (20°C) and is flammable.

3.3.116.5 ***Highly Toxic Gas.*** A chemical that has a median lethal concentration (LC50) in air of 200 ppm by volume or less of gas or vapor, or 2 mg/L or less 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 0.44 lb and 0.66 lb (200 g and 300 g) each.

3.3.116.6 ***Inert Gas.*** A nonreactive, nonflammable, noncorrosive gas such as argon, helium, krypton, neon, nitrogen, and xenon.

3.3.116.7 ***Irritant Gas.*** A chemical that is not corrosive, but that causes a reversible inflammatory effect on living tissue by chemical action at the site of contact. Chemical is a skin irritant if, when tested on the intact skin of albino rabbits by the methods of 16 CFR 1500.41, for an exposure of 4 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/approved in 16 CFR 1500.42, or other appropriate techniques.

3.3.116.8 ***Liquefied Gas.*** A gas, other than in solution, that in a packaging under the charged pressure exists both as a liquid and a gas at a temperature of 68°F (20°C).

3.3.116.9 ***Liquefied Natural Gas (LNG).*** A fluid in the cryogenic liquid state that is composed predominantly of methane and that can contain minor quantities of ethane, propane, nitrogen, and other components normally found in natural gas.

3.3.116.10 ***Liquefied Petroleum Gas (LP-Gas).*** Any material having a vapor pressure not exceeding that allowed for commercial propane that is composed predominantly of the following hydrocarbons, either by themselves (except propylene) or as mixtures: propane, propylene, butane(normal butane or isobutene), and butylenes.

3.3.116.11 ***Nonflammable Gas.*** A gas that does not meet the definition of a flammable gas.

3.3.116.12 ***Other Gas.*** A gas that is not a corrosive gas, flammable gas, highly toxic gas, oxidizing gas, pyrophoric gas, toxic gas, or unstable reactive gas with a hazard rating of Class 2, Class 3, or Class 4 gas.

3.3.116.13 ***Oxidizing Gas.*** A gas that can support and accelerate combustion of other materials more than air does.

3.3.116.14 ***Pyrophoric Gas.*** A gas with an auto ignition temperature in air at or below 130°F (54.4°C).

3.3.116.15 ***Scavenged Gas.*** A residual process gas that is collected for treatment or release at a location remote from the site of use.

3.3.116.16 ***Simple Asphyxiant Gas.*** A gas that does not provide sufficient oxygen to support life and that has none of the other physical or health hazards.

3.3.116.17 ***Toxic Gas.*** A gas with a median lethal concentration (LC50) in air of more than 200 ppm but not more than 2000 ppm by volume of gas or vapor, or more than 2 mg/L but not more than 20 mg/L 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 0.44 lb and 0.66 lb (200 g and 300 g) each.

3.3.116.18 ***Unstable Reactive Gas.*** A gas that, in the pure state or as commercially produced, will vigorously polymerize, decompose, or condense; become self-reactive; or otherwise undergo a violent chemical change under conditions of shock, pressure, or temperature.

3.3.117 Gas Cabinet. A fully enclosed, noncombustible enclosure used to provide an isolated environment for compressed gas cylinders in storage or use.

3.3.118 Gas Manufacturer/Producer. A business that produces compressed gases or cryogenic fluids, or both, or fills portable or stationary gas containers, cylinders, or tanks.

3.3.119 Gas Room. A separately ventilated, fully enclosed room in which only compressed gases, cryogenic fluids, associated equipment, and supplies are stored or used.

3.3.120 Gaseous Hydrogen System. A system in which hydrogen is delivered, stored, and discharged in the gaseous form to a piping system. The gaseous hydrogen system terminates at the point where hydrogen at service pressure first enters the distribution piping.

3.3.121 Ground Kettle. A container that could be mounted on wheels and is used for heating tar, asphalt, or similar substances.

3.3.122 Handling. The deliberate movement of material by any means to a point of storage or use.

3.3.123 Hazard of Contents

3.3.123.1 ***High Hazard.*** High hazard contents shall include materials defined as hazardous materials in 3.3.147.3, whether stored, used, or handled.

3.3.123.1.1 ***High Hazard Level 1 Contents.*** High hazard Level 1 contents shall include materials that present a detonation hazard including, but not limited to, the following: (1) Explosives; (2) Unclassified detonable organic peroxides; (3) Class 4 oxidizers; (4) Detonable pyrophoric materials; (5) Class 3 detonable and Class 4 unstable (reactive) materials.

3.3.123.1.2 ***High Hazard Level 2 Contents.*** High hazard Level 2 contents shall include materials that present a deflagration hazard or a hazard from accelerated burning including, but not limited to, the following:

(1) Class I, Class II, or Class III-A flammable or combustible liquids that are used or stored in normally open containers or systems, or in closed containers or systems at gauge pressures of more than 15 psi (103 kPa); (2) Combustible dusts stored, used, or generated in a manner creating a severe fire or explosion hazard; (3) Flammable gases and flammable cryogenic liquids;

(4) Class I organic peroxides; (5)Class 3 solid or liquid oxidizers that are used or stored in normally open containers or systems, or in closed containers or systems at gauge pressures of more than 15 psi (103 kPa); (6) No detonable pyrophoric materials; (7) Class 3 non-detonable unstable (reactive) materials; (8) Class 3 water-reactive materials.

3.3.123.1.3 ***High Hazard Level 3 Contents.*** High hazard Level 3 contents shall include materials that readily support combustion or present a physical hazard including, but not limited to, the following:

(1) Level 2 and Level 3 aerosols;

(2) Class I, Class II, or Class III-A flammable or combustible liquids that are used or stored in normally closed containers or systems at gauge pressures of less than 15 psi (103 kPa); (3) Flammable solids, other than dusts classified as high hazard Level 2, stored, used, or generated in a manner creating a high fire hazard;

(4) Class II and Class III organic peroxides;

(5) Class 2 solid or liquid oxidizers;

(6) Class 3 solid or liquid oxidizers that are used or stored in normally closed containers or systems at gauge pressures of less than 15 psi (103 kPa);

(7) Oxidizing gases and oxidizing cryogenic liquids;

(8) Class 2 unstable (reactive) materials;

(9) Class 2 water-reactive materials

3.3.123.1.4 ***High Hazard Level 4 Contents.*** High hazard Level 4 contents shall include materials that are acute health hazards including, but not limited to, the following:

(1) Corrosives;

(2) Highly toxic materials;

(3) Toxic materials

3.3.123.1.5 ***High Hazard Level 5 Contents.*** High hazard Level 5 contents include hazardous production materials (HPM) used in the fabrication of semiconductors or semiconductor research and development.

3.3.123.2 ***Low Hazard Contents.*** Low hazard contents shall be classified as those of such low combustibility that no self-propagating fire therein can occur.

3.3.123.3 ***Ordinary Hazard Contents.*** Ordinary hazard contents shall be classified as those that are likely to burn with moderate rapidity or to give off a considerable volume of smoke.

3.3.124 Hazard Rating. The numerical rating of the health, flammability, self-reactivity, and other hazards of the material, including its reaction with water.

3.3.125 Hazardous Material Storage Facility. Abuilding, a portion of a building, or exterior area used for the storage of hazardous materials in excess of exempt amounts.

3.3.126 Hazardous Materials Storage Locker. A movable prefabricated structure, manufactured primarily at a site other than the final location of the structure and transported completely assembled or in a ready-to-assemble package to the final location, and intended to meet local, state, and federal requirements for outside storage of hazardous materials.

3.3.127 Hazardous Reaction or Hazardous Chemical Reaction. Reactions that result in dangers beyond the fire problems relating to flash point and boiling point of either the reactants or of the products.

3.3.128 Heat Transfer Fluid (HTF). A liquid that is used as a medium to transfer heat energy from a heater or vaporizer to be mote heat consumer (e.g., injection molding machine, oven, or dryer, or jacketed chemical reactor).

3.3.129 Heliport. An identifiable area located on land, on water, or on a structure, that also includes any existing buildings or facilities thereon, used or intended to be used for landing and takeoff of helicopters.

3.3.130 Hogged Material. Mill waste consisting mainly of hogged bark but possibly including a mixture of bark, chips, dust, or other by-products from trees; also includes material designated as hogged fuel.

3.3.131 Immediately Dangerous to Life and Health (IDLH). A concentration of airborne contaminants, normally expressed in parts per million (ppm) or milligrams per cubic meter

that represents the maximum level from which one could escape within 30 minutes without any escape-impairing symptoms or irreversible health effects.

3.3.132 Imminent Danger. A condition or practice in an occupancy or structure that poses a danger that could reasonably be expected to cause death, serious physical harm, or serious property loss.

3.3.133 Incident Commander (IC). The individual responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources.

3.3.134 Incidental Liquid Use or Storage. Use or storage as a subordinate activity to that which establishes the occupancy or area classification.

3.3.135 Initiating Device Circuit. A circuit to which automatic or manual initiating devices are connected where the signal received does not identify the individual device operated.

3.3.136 ISO Module. An assembly of tanks or tubular cylinders permanently mounted in a frame conforming to International Organization for Standardization (ISO) requirements.

3.3.137 Jurisdiction. A governmental unit or political division or a subdivision.

3.3.138 Limit

3.3.138.1 ***Ceiling Limit.*** The maximum concentration of an airborne contaminant to which one can be exposed.

3.3.138.2 ***Permissible Exposure Limit (PEL).*** The maximum permitted 8-hour, time-weighted average concentration of an airborne contaminant.

3.3.138.3 ***Short-Term Exposure Limit (STEL).*** The concentration to which it is believed that workers can be exposed continuously for a short period of time without suffering from irritation, chronic or irreversible tissue damage, or narcosis of a degree sufficient to increase the likelihood of accidental injury, impairment of self-rescue, or the material reduction of work efficiency, without exceeding the daily permissible exposure limit (PEL).

3.3.139 Liquid. A material that has a melting point that is equal to or less than 68°F (20°C) and a boiling point that is greater than 68°F (20°C) and 14.7 psi (101.3 kPa). When not otherwise identified, the term liquid shall mean both flammable and combustible liquids.

3.3.139.1 ***Combustible Liquid.*** Any liquid that has a closed cup flash point at or above 100°F (37.8°C), as determined by the test procedures and apparatus.

3.3.139.2 ***Flammable Liquid.*** Any liquid that has a closed cup flash point below 100°F (37.8°C), as determined by the test procedures and apparatus.

3.3.139.3 ***Highly Volatile Liquid.*** A liquid with a boiling point of less than 68°F (20°C).

3.3.139.4 ***Stable Liquid.*** Any liquid not defined as unstable.

3.3.140 Log. Felled tree from which all the branches have been removed.

3.3.141 Loose House. A separate detached building in which unbaled combustible fibers are stored.

3.3.142 Lumber. Wood from felled trees having a section produced by lengthwise sawing or chipping of logs or other solid wood of large dimensions and possible crosscutting and/or further machining to obtain a certain size and includes boards, dimension lumber, timber, and similar wood products.

3.3.143 Manual Emergency Shutoff Valve. A designated valve designed to shut off the flow of gases or liquids that is manually operated.

3.3.144 Manual Fire Alarm Box. A manually operated device used to initiate a fire alarm signal.

3.3.145 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.

3.3.146 Marine Vessel. A water craft or other artificial contrivance used as a means of transportation in or on the water.

3.3.147 Material

3.3.147.1 ***Compatible Material.*** A material that, when in contact with an oxidizer, will not react with the oxidizer or promote or initiate its decomposition.

3.3.147.2 ***Corrosive Material.*** A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact.

3.3.147.3 ***Hazardous Material.*** A chemical or substance that is classified as a physical hazard material or a health hazard material, whether the chemical or substance is in usable or waste condition.

3.3.147.4 ***Hazardous Production Material (HPM).*** A solid, liquid, or gas associated with semiconductor manufacturing that has a degree-of-hazard rating of 3 or 4 in health, flammability, instability, or water reactivity and that is used directly in research, laboratory, or production processes that have as their end product materials that are not hazardous.

3.3.147.5 ***Health Hazard Material.*** A chemical or substance classified as a toxic, highly toxic, or corrosive material in accordance with definitions set forth in these Provisions.

3.3.147.6 ***Highly Toxic Material.*** A material that produces lethal dose or lethal concentration that falls within any of following categories: (1) a chemical that has a median lethal dose (LD50) of 50 mg/kg or less of body weight when administered orally to albino rats weighing between 200 and 300 g each; (2) a chemical that has a median lethal dose (LD50) of 200 mg/kg or less 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 kg and 3 kg each or albino rats weighing 200 g to 300 g each; (3) a chemical that has a median lethal concentration (LC50) in air of 200 parts per million by volume or less of gas or vapor, or 2 mg/L or less 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 g and 300 g each.

3.3.147.7 ***Incompatible Material.*** Materials that, when in contact with each other, have the potential to react in a manner that generates heat, fumes, gases or by-products that are hazardous to life or property.

3.3.147.8 ***Physical Hazard Material.*** A chemical or substance classified as a combustible liquid, explosive, flammable cryogen, flammable gas, flammable liquid, flammable solid, organic peroxide, oxidizer, oxidizing cryogen, pyrophoric, unstable (reactive), or water-reactive material.

3.3.147.9 ***Pyrophoric Material.*** A chemical with an auto ignition temperature in air at or below 130°F (54.4°C).

3.3.147.10 ***Toxic Material.*** A material that produces a lethal dose or a lethal concentration within any of the following categories: (1) a chemical or substance that has a median lethal dose (LD50) of more than 50 mg/kg but not more than 500 mg/kg of body weight when

administered orally to albino rats weighing between 200 g and 300 g each; (2) a chemical or substance that has a median lethal dose (LD50) of more than 200 mg/kg but not more than 1000 mg/kg of body weight when administered by continuous contact for 24 hours, or less if death occurs within24 hours, with the bare skin of albino rabbits weighing between 2 kg and 3 kg each; (3) a chemical or substance that has a median lethal concentration (LC50) in air of more than 200 parts per million but not more than 2000 parts per million by volume of gas or vapor, or more than 2 mg/L but not more than 20 mg/L, 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 g and 300 g each.

3.3.147.11 ***Unstable (Reactive) Material.*** A material that, in the pure state or as commercially produced, will vigorously polymerize, decompose or condense, become self-reactive, or otherwise undergo a violent chemical change under conditions of shock, pressure, or temperature.

3.3.147.12 ***Water-Reactive Material.*** A material that explodes, violently reacts, produces flammable, toxic, or other hazardous gases; or evolves enough heat to cause self-ignition or ignition of nearby combustibles upon exposure to water or moisture.

3.3.148 Material Safety Data Sheet (MSDS). Written or printed material concerning a hazardous material that is prepared in accordance with the provisions of OSHA 29 CFR1910.1200.

3.3.149 Maximum Allowable Quantity (MAQ). The quantity of hazardous material permitted in a control area.

3.3.150 Means of Egress. A continuous and un obstructed way of travel from any point in a building or structure to a public way consisting of three separate and distinct parts: (1) the exit access, (2) the exit, and (3) the exit discharge.

3.3.151 Means of Escape. Away out of a building or structure that does not conform to the strict definition of means of egress but does provide an alternate way out.

3.3.152 Mezzanine. An intermediate level between the floor and the ceiling of any room or space.

3.3.153 Mobile Supply Unit. Any supply source that is equipped with wheels so it is able to be moved around.

3.3.154 Motor Vehicle Fluid. A fluid that is a flammable, combustible, or hazardous material, such as crankcase fluids, fuel, brake fluids, transmission fluids, radiator fluids, and gear oil.

3.3.155 Nesting. A method of securing cylinders upright in a tight mass using a contiguous three-point contact system whereby all cylinders in a group have a minimum of three contact points with other cylinders or a solid support structure (e.g., a wall or railing).

3.3.156 Normal Temperature and Pressure (NTP). A temperature of 70°F (21°C) at an absolute pressure of 14.7 psi (101.3 kPa).

3.3.157 Occupancy. The purpose for which a building or other structure, or part thereof, is used or intended to be used.

3.3.157.1 ***Apartment Building.*** A building or portion thereof exceeding 9 m (30 ft) in height or five dwelling units with independent cooking and bathroom facilities.

3.3.157.2 ***Assembly Occupancy.*** An occupancy (1) used for a gathering of 50 or more persons for deliberation, worship, entertainment, eating, drinking, amusement, awaiting

transportation, or similar uses; or (2) used as a special amusement building, regardless of occupant load.

3.3.157.3 ***Bulk Merchandising Retail Building.*** A building in which the sales area includes the storage of combustible materials on pallets, in solid piles, or in racks in excess of 12 ft (3660 mm) in storage height.

3.3.157.4 ***Business Occupancy.*** An occupancy used for the transaction of business other than mercantile.

3.3.157.5 ***Day-Care Home.*** A building or portion of a building in which more than 3 but not more than 12 clients receive care, maintenance, and supervision, by other than their relative(s) or legal guardian(s), for less than 24 hours per day.

3.3.157.6 ***Day-Care Occupancy.*** An occupancy in which four or more clients receive care, maintenance, and supervision, by other than their relatives or legal guardians, for less than 24 hours per day.

3.3.157.7 ***Detention and Correctional Occupancy.*** An occupancy used to house one or more persons under varied degrees of restraint or security where such occupants are mostly incapable of self-preservation because of security measures not under the occupants' control.

3.3.157.7.1 ***Detention and Correctional Use Condition.*** For application of the life safety requirements in Section 20.7, the resident user category is divided into the five use conditions.

3.3.157.7.1.1 ***Use Condition I — Free Egress.*** A condition under which free movement is allowed from sleeping areas and other spaces where access or occupancy is permitted to the exterior via means of egress.

3.3.157.7.1.2 ***Use Condition II—Zoned Egress.*** A condition under which free movement is allowed from sleeping area sand any other occupied smoke compartment to one or more other smoke compartments.

3.3.157.7.1.3 ***Use Condition III — Zoned Impeded Egress.*** A condition under which free movement is allowed within individual smoke compartments, such as within a residential unit comprised of individual sleeping rooms and a group activity space, with egress impeded by remote-controlled release of means of egress from such a smoke compartment to another smoke compartment.

3.3.157.7.1.4 ***Use Condition IV — Impeded Egress.*** A condition under which free movement is restricted from an occupied space, and remote-controlled release is provided to allow movement from all sleeping rooms, activity spaces, and other occupied areas within the smoke compartment to another smoke compartment.

3.3.157.7.1.5 ***Use Condition V—Contained.*** A condition under which free movement is restricted from an occupied space, and staff-controlled manual release at each door is provided to allow movement from all sleeping rooms, activity spaces, and other occupied areas within the smoke compartment to another smoke compartment.

3.3.157.8 ***Dormitory.*** A building or a space in a building in which group sleeping accommodations are provided for more than 16 persons who are not members of the same family in one room, or a series of closely associated rooms under joint occupancy and single management, with or without meals, but without individual cooking facilities.

3.3.157.9 ***Educational Occupancy.*** An occupancy used for educational purposes through the twelfth grade by six or more persons for 4 or more hours per day or more than 12 hours per week.

3.3.157.10 ***Health Care Occupancy.*** An occupancy used to provide medical or other treatment or care simultaneously to four or more patients on an inpatient basis, where such patients are mostly incapable of self-preservation due to age, physical or mental disability, or because of security measures not under the occupants' control.

3.3.157.11 ***Hospital.*** A building or portion thereof used on a 24-hour basis for the medical, psychiatric, obstetrical, or surgical care of four or more inpatients.

3.3.157.12 ***Hotel.*** A building or groups of buildings under the same management in which there are sleeping accommodations for more than 16 persons and primarily used by transients for lodging with or without meals.

3.3.157.13 ***Industrial Occupancy.*** An occupancy in which products are manufactured or in which processing, assembling, mixing, packaging, finishing, decorating, or repair operations are conducted.

3.3.157.14 ***Limited Care Facility.*** A building or portion of a building used on a 24-hour basis for the housing of four or more persons who are incapable of self-preservation because of age; physical limitations due to accident or illness; or limitations such as mental retardation/developmental disability, mental illness, or chemical dependency.

3.3.157.15 ***Lodging or Rooming House.*** A building or portion thereof that does not qualify as a one- or two-family dwelling, that provides sleeping accommodations for a total of 16 or fewer people on a transient or permanent basis, without personal care services, with or without meals, but without separate cooking facilities for individual occupants.

3.3.157.16 ***Mercantile Occupancy.*** An occupancy used for the display and sale of merchandise.

3.3.157.16.1 ***Class A Mercantile Occupancy.*** All mercantile occupancies having an aggregate gross area of more than 30,000 ft^2 (2800 m^2) or occupying more than three stories for sales purposes.

3.3.157.16.2 ***Class B Mercantile Occupancy.*** All mercantile occupancies of more than 3000 ft^2 (280 m^2), but not more than 30,000 ft^2 (2800 m^2), aggregate gross area and occupying not more than three stories for sales purposes. Class B also includes all mercantile occupancies of not more than 3000 ft^2 (280 m^2) gross area and occupying two or three stories forsakes purposes.

3.3.157.16.3 ***Class C Mercantile Occupancy.*** All mercantile occupancies of not more than 3000 ft^2 (280 m^2) gross area and used for sales purposes occupying one story only.

3.3.157.17 ***Mixed Occupancy.*** A multiple occupancy where the occupancies are intermingled.

3.3.157.18 ***Motor Fuel Dispensing Facility.*** That portion of a property where motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles or marine craft or into approved containers, including all equipment used in connection therewith.

3.3.157.18.1 ***Fleet Vehicle Motor Fuel Dispensing Facility.*** A motor fuel dispensing facility at a commercial, industrial, governmental, or manufacturing property where motor fuels are dispensed into the fuel tanks of motor vehicles that are used in connection with the business or operation of that property by persons within the employ of such business or operation.

3.3.157.18.2 ***Marine Motor Fuel Dispensing Facility.*** A motor fuel dispensing facility at or adjacent to shore, a pier, a wharf, or a floating dock where motor fuels are dispensed into the fuel tanks of marine craft.

3.3.157.18.3 ***Motor Fuel Dispensing Facility Located Inside a Building.*** That portion of a motor fuel dispensing facility located within the perimeter of a building or building structure that also contains other occupancies.

3.3.157.19 ***Multiple Occupancy.*** A building or structure in which two or more classes of occupancy exist.

3.3.157.20 ***Nursing Home.*** A building or portion of a building used on a 24-hour basis for the housing and nursing care of four or more persons who, because of mental or physical incapacity, might be unable to provide for their own needs and safety without the assistance of another person.

3.3.157.21 ***One- and Two-Family Dwelling.*** One- and two family dwellings include buildings containing not more than two dwelling units in which each dwelling unit is occupied by members of a single family with not more than three outsiders, if any, accommodated in rented rooms.

3.3.157.21.1 ***One- and Two-Family Dwelling Unit.*** A building that contains not more than two dwelling units within dependent cooking and bathroom facilities.

3.3.157.22 ***Parking Structure.*** A building, structure, or portion thereof used for the parking, storage, or both, of motor vehicles.

3.3.157.22.1 ***Basement and Underground Parking Structures.*** Parking structures that are located below grade. Abasement parking structure has other occupancies above it and an underground parking structure has no occupancy other than parking above it. Basement and underground parking structures are considered as specific cases of enclosed parking structures.

3.3.157.22.2 ***Enclosed Parking Structure.*** Any parking structure that is not an open parking structure.

3.3.157.22.3 ***Open Parking Structure.*** A parking structure that meets the requirements of Section 5.5 of NFPA 88A or any approved code/standard.

3.3.157.23 ***Repair Garages***

3.3.157.23.1 ***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.

3.3.157.23.2 ***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.

3.3.157.24 ***Residential Board and Care Occupancy.*** An occupancy used for lodging and boarding of four or more residents, not related by blood or marriage to the owners or operators, for the purpose of providing personal care services.

3.3.157.25 ***Residential Occupancy.*** An occupancy that provides sleeping accommodations for purposes other than health care or detention and correctional.

3.3.157.26 ***Separated Occupancy.*** A multiple occupancy where the occupancies are separated by fire resistance–rated assemblies.

3.3.157.27 ***Storage Occupancy.*** An occupancy used primarily for the storage or sheltering of goods, merchandise, products, or vehicles.

3.3.157.27.1 ***Mini-Storage Building.*** A storage occupancy partitioned into individual storage units, with a majority of the individual units not greater than 750 ft^2 (70 m^2) in area that are rented or leased for the purposes of storing personal or business items where all of the following apply:

(1) the storage units are separated from each other by less than 1-hour fire resistance rated barrier,

(2) the owner of the facility does not have unrestricted access to the storage units, and

(3) the items being stored are concealed from view from outside the storage unit.

3.3.158 Occupant Load. The total number of persons that might occupy a building or portion thereof at any one time.

3.3.159 Operating Pressure. The pressure at which a system operates.

3.3.160 Operating Unit (Vessel) or Process Unit (Vessel). The equipment in which a unit operation or unit process is conducted.

3.3.161 Operations. A general term that includes, but is not limited to, the use, transfer, storage, and processing of liquids.

3.3.162 Organic Peroxide. Any organic compound having a double oxygen or peroxy (-O-O-) group in its chemical structure.

3.3.162.1 ***Organic Peroxide Formulation.*** A pure or technically pure organic peroxide or a mixture of organic peroxides alone or in combination with one or more materials in various combinations and concentrations.

3.3.162.1.1 ***Class I.*** Class I shall describe those formulations that are more severe than a Class II but do not detonate.

3.3.162.1.2 ***Class II.*** Class II shall describe those formulations that burn very rapidly and that present a severe reactivity hazard.

3.3.162.1.3 ***Class III.*** Class III shall describe those formulations that burn rapidly and that present a moderate reactivity hazard.

3.3.162.1.4 ***Class IV.*** Class IV shall describe those formulations that burn in the same manner as ordinary combustibles and that present a minimal reactivity hazard.

3.3.162.1.5 ***Class V.*** Class V shall describe those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that present no reactivity hazard.

3.3.163 OSHA. The Occupational Safety and Health Administration of the U.S. Department of Labor.

3.3.164 Overcrowded. A situation where the occupant load exceeds the exit capacity or the posted occupant load.

3.3.165 Oxidizer. Any solid or liquid material that readily yields oxygen or other oxidizing gas or that readily reacts to promote or initiate combustion of combustible materials and that can, under some circumstances undergo a vigorous self-sustained decomposition due to contamination or heat exposure.

3.3.165.1 ***Class 1.*** An oxidizer that does not moderately increase the burning rate of combustible materials with which it comes into contact or a solid oxidizer classified as Class 1.

3.3.165.2 ***Class 2.*** An oxidizer that causes a moderate increase in the burning rate of combustible materials with which it comes into contact or a solid oxidizer classified as Class 2.

3.3.165.3 ***Class 3.*** An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes into contact or a solid oxidizer classified as Class 3.

3.3.165.4 ***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.

3.3.166 Ozone Generator. Equipment that causes the production of ozone.

3.3.167 Packaging. A commodity wrapping, cushioning, or container.

3.3.168 Paper. Felted sheets made from natural fibrous materials, usually vegetable but sometimes mineral or animal, and formed on a fine wire screen by means of water suspension.

3.3.169 Patch Kettle. Any pot or container with a capacity of less than 6 gal (22.7 L) used for preheating tar, asphalt, pitch, or similar substances for the repair of roofs, streets, floors, pipes, or similar objects.

3.3.170 Permit. A document issued by AHJ for the purpose of authorizing performance of a specified activity.

3.3.171 Peroxide-Forming Chemical. A chemical that, when exposed to air, forms explosive peroxides that are shock sensitive, pressure sensitive, or heat sensitive.

3.3.172 Personal Care. The care of residents who do not require chronic or convalescent medical or nursing care.

3.3.173 Pesticide. Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating anapest or for use as a plant regulator, defoliant, or desiccant.

3.3.174 Physical Hazard. A chemical for which there is scientifically valid evidence that the chemical is an organic peroxide or oxidizer.

3.3.175 Pier. A structure, usually of greater length than width and projecting from the shore into a body of water with direct access from land that can be either open deck or provided with a superstructure.

3.3.176 Pressure Vessel. A container, process vessel, or other component designed in accordance with the ASME Boiler and Pressure Vessel Code, DOT, or other approved standards.

3.3.177 Primary Containment. The first level of containment, consisting of the inside portion of that container that comes into immediate contact on its inner surface with the material being contained.

3.3.178 Process or Processing. An integrated sequence of operations.

3.3.179 Proprietary Information. Information regarding compounds or ingredients used in a process or production that do not qualify as trade secrets but that provide an industry or business with a competitive advantage.

3.3.180 Protection for Exposures. Fire protection for structures on property adjacent to liquid storage that is provided by

(1) a public fire department or

(2) a private fire brigade maintained on the property adjacent to the liquid storage, either of which is capable of providing cooling water streams to protect the property adjacent to the liquid storage.

3.3.181 Public Way. A Street, alley, or other similar parcel of land essentially open to the outside air deeded, dedicated, or otherwise permanently appropriated to the public for public use and having a clear width and height of not less than 10 ft (3050 mm).

3.3.182 Purging. A method used to free the internal volume of a piping system of unwanted contents that results in the existing contents being removed or replaced.

3.3.183 Pyrophoric. A chemical that spontaneously ignites in air at or below a temperature of 130°F (54.5°C).

3.3.184 Quality Assurance. The procedures conducted by the registered design professionals (RDPs) responsible for design and the registered design professionals responsible for inspection that provide evidence and documentation to the RDPs, the owner, and AHJ that the work is being constructed in accordance with the approved construction documents.

3.3.185 Quality Assurance Program. A predefined set of observations, special inspections, tests, and other procedures that provide an independent record to the owner, AHJ, and RDP responsible for design that the construction is in general conformance with the approved construction documents.

3.3.186 Rack. Any combination of vertical, horizontal, and diagonal members that supports stored materials.

3.3.186.1 ***Double-Row Racks.*** Racks less than or equal to12 ft (3.7 m) in depth or single-row racks placed back to back having an aggregate depth up to 12 ft (3.7 m), with aisles having an aisle width of at least 3.5 ft (1.1 m) between loads on racks.

3.3.186.2 ***Movable Racks.*** Racks on fixed rails or guides.

3.3.186.3 ***Multiple-Row Racks.*** Racks greater than 12 ft (3.7 m) in depth or single- or double-row racks separated by aisles less than 3.5 ft (1.1 m) wide having an overall width greater than 12 ft (3.7 m).

3.3.186.4 ***Portable Racks.*** Racks that are not fixed in place and can be arranged in any number of configurations.

3.3.186.5 ***Single-Row Racks.*** Racks that have no longitudinal flue space and that have a depth up to 6 ft (1.8 m) with aisles having a width of at least 3.5 ft (1.1 m) between loads on racks.

3.3.187 Ramp. A walking surface that has a slope steeper than 1 in 20.

3.3.188 Recreational Fire. The noncommercial burning of materials other than rubbish for pleasure, religious, ceremonial, cooking, or similar purposes in which the fuel burned is not contained in an incinerator, a barbecue grill, or a barbecue pit, and the total fuel area is not exceeding 3 ft (0.9 m) in diameter and 2 ft (0.6 m) in height.

3.3.189 Refinery. A plant in which flammable or combustible liquids are produced on a commercial scale from crude petroleum, natural gasoline, or other hydrocarbon sources.

3.3.190 Registered Design Professional (RDP). An individual who is registered or licensed to practice his/her respective design profession as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed.

3.3.191 Relocatable Power Tap. A device for indoor use consisting of an attachment plug on one end of a flexible cord and two or more receptacles on the opposite end, and has over current protection.

3.3.192 Row. A minimum yard storage unit comprised of adjoining cotton bales.

3.3.193 Safety Can. A listed/approved container of not more than 5.3 gal (20 L) capacity having a screen or strainer in each fill and pour opening, and having a spring-closing lid and spout cover, designed to safely relieve internal pressure when exposed to fire.

3.3.194 Salvage Vehicle. A vehicle that is dismantled for parts or awaiting destruction.

3.3.195 Self-Closing. Equipped with an approved device that ensures closing after opening.

3.3.196 Separation of Hazards. Physically separated by a specified distance, construction, or appliance.

3.3.197 Shop Drawings. Scaled working drawings, equipment cut sheets, and design calculations.

3.3.198 Signal

3.3.198.1 ***Alarm Signal.*** A signal that results from the manual or automatic detection of an alarm condition.

3.3.198.2 ***Fire Alarm Signal.*** A signal that results from the manual or automatic detection of a fire alarm condition.

3.3.198.3 ***Supervisory Signal.*** A signal that results from the detection of a supervisory condition.

3.3.198.4 ***Trouble Signal.*** A signal that results from the detection of a trouble condition.

3.3.199 Smoke Alarm. A single or multiple-station alarm responsive to smoke.

3.3.200 Smoke Barrier. A continuous membrane, or a membrane with discontinuities created by protected openings, where such membrane is designed and constructed to restrict the movement of smoke.

3.3.201 Smoke Partition. A continuous membrane that is designed to form a barrier to limit the transfer of smoke.

3.3.202 Smoking. The use or carrying of a lighted pipe, cigar, cigarette, tobacco, or any other type of smoking substance.

3.3.203 Solid

3.3.203.1 ***Combustible Particulate Solid.*** An oxidizable, solid-phase material comprising distinct particles or pieces.

3.3.203.2 ***Flammable Solid.*** A solid substance, other than a substance defined as a blasting agent or explosive, that is liable to cause fire resulting from friction or retained heat from manufacture, that has an ignition temperature below 212°F (100°C), or that burns so vigorously or persistently when ignited that it creates a serious hazard.

3.3.204 Solid Material. A material that has a melting point, decomposes, or sublimes at a temperature greater than 68°F (20°C).

3.3.205 Solid Shelving. Solid shelving is fixed in place, slatted, wire mesh, or other type of shelves located within racks. The area of a solid shelf is defined by perimeter aisle or flue space on all four sides. Solid shelves having an area equal to or less than 20 ft^2 (1.9 m^2) shall

be defined as open racks. Shelves of wire mesh, slats, or other materials more than 50 percent open and where the flue spaces are maintained shall be defined as open racks.

3.3.206 Spray Booth. A power-ventilated enclosure for a spray application operation or process that confines and limits the escape of the material being sprayed, including vapors, mists, dusts, and residues that are produced by the spraying operation and conducts or directs these materials to an exhaust system.

3.3.207 Spray Room. A power-ventilated fully enclosed room used exclusively for open spraying of flammable or combustible materials.

3.3.208 Standard Cubic Foot (scf) of Gas. An amount of gas that occupies one cubic foot at an absolute pressure of 14.7 psi (101 kPa) and a temperature of 70°F (21°C).

3.3.209 Standard Temperature and Pressure (STP). A temperature of 70°F (21°C) and a pressure of 1 atmosphere (14.7 psi or 760 mm Hg).

3.3.210 Storage

3.3.210.1 ***Banded Tire Storage.*** Storage in which a number of tires are strapped together.

3.3.210.2 ***Cartoned Storage.*** Storage consisting of corrugated cardboard or paperboard containers that fully enclose the commodity.

3.3.210.3 ***Detached Storage.*** Storage in a separate building or in an outside area located away from all structures.

3.3.210.4 ***High-Piled Storage.*** Solid-piled, palletized, rack storage, bin box, and shelf storage in excess of 12 ft (3.7 m) in height.

3.3.210.5 ***Isolated Storage.*** Storage in a different storage room or in a separate and detached building located at a safe distance.

3.3.210.6 ***Laced Tire Storage.*** Tires stored where the sides of the tires overlap, creating a woven or laced appearance.

3.3.210.7 ***Miscellaneous Tire Storage.*** The storage of rubber tires that is incidental to the main use of the building. Storage areas shall not exceed 2000 ft^2 (186 m^2). On-tread storage piles, regardless of storage method, shall not exceed 25 ft (7.6 m) in the direction of the wheel holes. Acceptable storage arrangements include (a) on-floor, onside storage up to 12 ft (3.7 m) high; (b) on-floor, on-tread storage up to 5 ft (1.5 m) high; (c) double-row or multi row fixed or portable rack storage on-side or on-tread up to 5 ft (1.5 m) high; (d) single row fixed or portable rack storage on-side or on-tread up to 12 ft (3.7 m) high; and (e) laced tires in racks up to 5 ft (1.5 m) in height.

3.3.210.8 ***On-Side Tire Storage.*** Tires stored horizontally or flat.

3.3.210.9 ***On-Tread Tire Storage.*** Tires stored vertically or on their treads.

3.3.210.10 ***Palletized Tire Storage.*** Storage on portable racks of various types utilizing a conventional pallet as a base.

3.3.210.11 ***Segregated Storage.*** Storage located in the same room or inside area that is physically separated by distance from incompatible materials.

3.3.210.12 ***Yard Storage.*** Storage of commodities in outdoor areas.

3.3.211 Storage Aids. Commodity storage devices, such as pallets, dunnage, separators, and skids.

3.3.212 Story. The portion of a building located between the upper surface of a floor and the upper surface of the floor or roof next above.

3.3.212.1 ***Occupiable Story.*** A story occupied by people on a regular basis.

3.3.213 Street. A public thoroughfare that has been dedicated for vehicular use by the public and can be used for access by fire department vehicles.

3.3.214 Street Floor. A story or floor level accessible from the street or from outside the building at the finished ground level, with the floor level at the main entrance located not More than three risers above or below the finished ground level, and arranged and utilized to qualify as the main floor.

3.3.215 Structural Element. The columns and girders, beams, trusses, joists, braced frames, moment-resistant frames, and vertical and lateral resisting elements, and other framing members that are designed to carry any portion of the dead or live load and lateral forces, that are essential to the stability of the building or structure.

3.3.216 Structure. That which is built or constructed.

3.3.217 Summarily Abate. To immediately judge a condition to be a fire hazard to life or property and to order immediate correction of such condition.

3.3.218 System. Several items of equipment assembled, grouped, or otherwise interconnected for the accomplishment of a purpose or function.

3.3.218.1 ***Bulk Hydrogen Compressed Gas System.*** An assembly of equipment that consists of, but is not limited to, storage containers, pressure regulators, pressure relief devices, compressors, manifolds, and piping, with a storage capacity of more than (5000 scoff) (141.6 Nm^3) of compressed hydrogen gas and that terminates at the source valve.

3.3.218.2 ***Bulk Inert Gas System.*** An assembly of equipment that consists of, but is not limited to, storage containers, pressure regulators, pressure relief devices, vaporizers, manifolds, and piping, with a storage capacity of more than 20,000 scoff (566 Nm^3) of inert gas, including unconnected reserves on hand at the site, and that terminates at the source valve.

3.3.218.3 ***Bulk Liquefied Hydrogen System.*** An assembly of equipment that consists of, but is not limited to, storage containers, pressure regulators, pressure relief devices, vaporizers, liquid pumps, compressors, manifolds, and piping, with a storage capacity of more than 39.7 gal (150 L) of liquefied hydrogen that terminates at the source valve.

3.3.218.4 ***Bulk Oxygen System.*** An assembly of equipment such as oxygen storage containers, pressure regulators, pressure relief devices, vaporizers, manifolds, and interconnecting piping that has a storage capacity of more than 20,000 scf (566 Nm^3) of oxygen and that terminates at the source valve.

3.3.218.5 ***Central Station Service Alarm System.*** A system or group of systems in which the operations of circuits and devices are transmitted automatically to, recorded in, maintained by, and supervised from a listed/approved central station that has competent and experienced servers and operators who, upon receipt of a signal, take such action. Such service is to be controlled and operated by a person, firm, or corporation whose business is the furnishing, maintaining, or monitoring of supervised alarm systems.

3.3.218.6 ***Compressed Gas System.*** An assembly of equipment designed to contain, distribute, or transport compressed gases.

3.3.218.7 ***Continuous Gas Detection System.*** A gas detection system in which the instrument is maintained in continuous operation and the interval between sampling of any point does not exceed 30 minutes.

3.3.218.8 ***Cylinder Containment System.*** A gastight recovery system comprising equipment or devices that can be placed over a leak in a compressed gas container, thereby stopping or controlling the escape of gas from the leaking container.

3.3.218.9 ***Dedicated Smoke-Control System.*** A system that is intended for the purpose of smoke control only, which are separate systems of air moving and distribution equipment that do not function under normal building operating conditions.

3.3.218.10 ***Fire Alarm System.*** A system or portion of a combination system that consists 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.

3.3.218.11 ***Fire Protection System.*** Any fire alarm device or system or fire-extinguishing device or system, or combination thereof, that is designed and installed for detecting, controlling, or extinguishing a fire or otherwise alerting occupants, or the fire department, or both, that a fire has occurred.

3.3.218.12 ***Nondedicated Smoke-Control System.*** A smoke control system that shares components with some other system(s), such as the building HVAC system, which changes its mode of operation to achieve the smoke control objective.

3.3.218.13 ***Standpipe System.*** An arrangement of piping, valves, hose connections, and allied equipment installed in a building or structure, with the hose connections located in such a manner that water can be discharged in streams or spray patterns through attached hose and nozzles, for the purpose of extinguishing a fire, thereby protecting abuilding or structure and its contents in addition to protecting the occupants.

3.3.218.14 ***Treatment System.*** An assembly of equipment capable of processing a hazardous gas and reducing the gas concentration to a predetermined level at the point of discharge from the system to the atmosphere.

3.3.218.15 ***Vapor Processing System.*** A system designed to capture and process vapors displaced during transfer or filling operations by use of mechanical or chemical means.

3.3.218.16 ***Vapor Recovery System.*** A system designed to capture and retain, without processing, vapors displaced during transfer or filling operations.

3.3.219 Tank

3.3.219.1 ***Aboveground Storage Tank.*** A horizontal or vertical tank that is listed/approved and intended for fixed installation, without backfill, above or below grade and is used within the scope of its approval or listing.

3.3.219.2 ***Aboveground Tank.*** A tank that is installed above grade, at grade, or below grade without backfill.

3.3.219.2.1 ***Protected Aboveground Tank.*** An atmospheric aboveground storage tank with integral secondary containment and thermal insulation that has been evaluated for resistance to physical damage and for limiting the heat transferred to the primary tank when exposed to a hydrocarbon pool fire.

3.3.219.3 ***Portable Tank. (Compressed Gases and Cryogenic Fluids)*** Any vessel having a liquid capacity over 60 gal (230 L) intended for storing liquids and not intended for fixed installation.

3.3.219.4 ***Secondary Containment Tank.*** A tank that has an inner and outer wall with an interstitial space (annulus) between the walls and that has a means for monitoring the interstitial space for a leak.

3.3.219.5 ***Stationary Tank.*** A 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.

3.3.219.6 ***Storage Tank.*** Any vessel having a liquid capacity that exceeds 60 gal (230 L), is intended for fixed installation, and is not used for processing.

3.3.220 Temporary Wiring. Approved wiring for power and lighting during a period of construction, remodeling, maintenance, repair, or demolition, and decorative lighting, carnival power and lighting, and similar purposes.

3.3.221 Tire

3.3.221.1 ***Rubber Tires.*** Pneumatic tires for passenger automobiles, aircraft, light and heavy trucks, trailers, farm equipment, construction equipment (off-the-road), and buses.

3.3.221.2 ***Scrap Tire.*** A tire that can no longer be used for its original purpose due to wear or damage.

3.3.222 Traffic Calming Device. A roadway design element utilized to reduce vehicle speeds, decrease motor vehicle volumes, and increase safety for pedestrians and non-motorized vehicles.

3.3.223 Tube Trailer. A truck or semitrailer on which a number of very long compressed gas tubular cylinders have been mounted and manifold into a common piping system.

3.3.224 Unauthorized Discharge. A release or emission of materials in a manner that does not conform to the provisions of these Provisions or applicable public health and safety provisions.

3.3.225 Unit Operation or Unit Process. A segment of a physical or chemical process that might or might not be integrated with other segments to constitute the manufacturing sequence.

3.3.226 Use. To place a material, including solids, liquids, and gases into action.

3.3.226.1 ***Closed System Use.*** Use of a solid or liquid hazardous material in 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.

3.3.226.2 ***Open System Use.*** Use of a solid or liquid hazardous material in 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.

3.3.226.3 ***Special Use.*** A use that includes, but is not limited to, events or occurrences during which life safety–threatening situations or fire hazards exist or are likely to exist as determined by AHJ.

3.3.227 Valve

3.3.227.1 ***Indicating Valve.*** A valve that has components that show if the valve is open or closed. Examples are outside screw and yoke (OS&Y) gate valves and underground gate valves with indicator posts.

3.3.227.2 ***Reduced Flow Valve.*** A valve equipped with a restricted flow orifice that is designed to reduce the maximum flow from the valve under full flow conditions.

3.3.227.3 ***Valve Outlet Cap or Plug.*** Are movable device that forms a gastight seal on the outlet to the control valve that is provided on a source containing a compressed gas or cryogenic fluid.

3.3.227.4 ***Valve Protection Cap.*** A rigid, removable cover provided for container valve protection during handling, transportation, and storage.

3.3.227.5 ***Valve Protection Device.*** A device attached to the neck ring or body of a cylinder for the purpose of protecting the cylinder valve from being struck or from being damaged by the impact resulting from a fall or an object striking the cylinder.

3.3.228 Vapor Pressure. The pressure, measured in pounds per square inch, absolute (psi), exerted by a liquid.

3.3.229 Warehouse

3.3.229.1 ***General-Purpose Warehouse.*** A separate, detached building or portion of a building used only for warehousing type operations and classified as a "storage-low hazard" or "storage-ordinary hazard" occupancy by the building code.

3.3.229.2 ***Liquid Warehouse.*** A separate, detached building or an attached building that is used for warehousing type operations for liquids and whose exterior wall comprises at least 25 percent of the building perimeter.

3.3.230 Water Capacity. The amount of water at 60°F (16°C) required to fill a container.

3.3.231 Wharf. A structure at the shoreline that has a platform built along and parallel to a body of water with either an open deck or a superstructure.

3.3.232 Wildland/Urban Interface. The presence of structures in locations in which AHJ determines that topographical features, vegetation fuel types, local weather conditions, and prevailing winds result in the potential for ignition of the structures within the area from flames and firebrands of a wildland fire.

3.3.233 Wood Panel. Board or sheet made from veneers, particles, or fibers of wood and includes plywood, oriented strand board, and similar wood products.

3.3.234 Written Notice. A notification in writing delivered in person to the individual or parties intended, or delivered at, or sent by certified or registered mail to, the last residential or business address of legal record.

3.4 Special Performance-Based Definitions

3.4.1 Alternative Calculation Procedure. A calculation procedure that differs from the procedure originally employed by the design team but that provides predictions for the same variables of interest.

3.4.2 Data Conversion. The process of developing the input data set for the assessment method of choice.

3.4.3 Design Specification. A building characteristic and other conditions that are under the control of the design team.

3.4.4 Design Team. A group of stakeholders including, but not limited to, representatives of the architect, client, and any pertinent engineers and other designers.

3.4.5 Exposure Fire. A fire that starts at a location that is remote from the area being protected and grows to expose that which is being protected.

3.4.6 Fire Model. Mathematical prediction of fire growth, environmental conditions, and potential effects on structures, systems, or components based on the conservation equations or empirical data.

3.4.7 Fire Scenario. A set of conditions that defines the development of fire, the spread of combustion products throughout a building or portion of a building, the reactions of people to fire, and the effects of combustion products.

3.4.7.1 ***Design Fire Scenario.*** A fire scenario selected for evaluation of a proposed design.

3.4.8 Fuel Load. The total quantity of combustible contents of a building, space, or fire area.

3.4.9 Incapacitation. A condition under which humans do not function adequately and become unable to escape untenable conditions.

3.4.10 Input Data Specification. Information required by the verification method.

3.4.11 Occupant Characteristics. The abilities or behaviors of people before and during a fire.

3.4.12 Performance Criteria. Threshold values on measurement scales that are based on quantified performance objectives.

3.4.13 Proposed Design. A design developed by a design team and submitted to AHJ for approval.

3.4.14 Safe Location. A location remote or separated from the effects of a fire so that such effects no longer pose a threat.

3.4.15 Safety Factor. A factor applied to a predicted value to ensure that a sufficient safety margin is maintained.

3.4.16 Safety Margin. The difference between a predicted value and the actual value where a fault condition is expected.

3.4.17 Stakeholder. An individual, or representative of same, having an interest in the successful completion of a project.

Chapter 4 General Requirements

4.1 Goals and Objectives

4.1.1 Goals. The goals of these Provisions shall be to provide a reasonable level of safety, property protection, and public welfare from the hazards created by fire.

4.1.2 Safety. These Provisions shall provide for life safety by reducing the probability of injury or death from fire.

4.2 Fundamental Requirements

4.2.1 Multiple Safeguards

4.2.1.1 The design of every building or structure intended for human occupancy shall be such that reliance for property protection and safety to life does not depend solely on any single safeguard.

4.2.1.2 Additional safeguard(s) shall be provided for property protection and life safety in the event that any single safeguard is ineffective due to inappropriate human actions, building failure, or system failure.

4.2.2 Appropriateness of Safeguards. Every building or structure shall be provided with means of egress and other safeguards of the kinds, numbers, locations, and capacities appropriate to the individual building or structure, with due regard to the following:

(1) Characteristics of the occupancy

(2) Capabilities of the occupants

(3) Number of persons exposed

(4) Fire protection available

(5) Capabilities of response personnel

(6) Height and type of construction of the building or structure

(7) Other factors necessary to provide occupants with a reasonable degree of safety

(8) Other factors necessary to protect the building and contents from damage

4.2.3 Means of Egress

4.2.3.1 Unobstructed Egress

4.2.3.1.1 In every occupied building or structure, means of egress from all parts of the building shall be maintained free and unobstructed.

4.2.3.1.2 No lock or fastening shall be permitted that prevents free escape from the inside of any building other than in health care occupancies and detention and correctional occupancies where staff are continually on duty and effective provisions are made to remove occupants in case of fire or other emergency.

4.2.3.1.3 Means of egress shall be accessible to the extent necessary to ensure reasonable safety for occupants having impaired mobility.

4.2.3.2 Awareness of Egress System

4.2.3.2.1 Every exit shall be clearly visible, or the route to reach every exit shall be conspicuously indicated.

4.2.3.2.2 Each means of egress, in its entirety, shall be arranged or marked so that the way to a place of safety is indicated in a clear manner.

4.2.3.2.3 Lighting. Illumination of means of egress shall be provided.

4.2.4 Occupant Notification. In every building or structure of such size, arrangement, or occupancy that a fire itself could not provide adequate occupant warning, fire alarm systems shall be provided where necessary to warn occupants of the existence of fire.

4.2.5 Vertical Openings. Every vertical opening between the floors of a building shall be suitably enclosed or protected, as necessary, to provide the following:

(1) Reasonable safety to occupants while using the means of egress by preventing spread of fire, smoke, or fumes through vertical openings from floor to floor to allow occupants to complete their use of the means of egress

(2) Limitation of damage to the buildings and its contents

4.2.6 System Design/Installation. Any fire protection system, building service equipment, feature of protection, or safeguard provided to achieve the goals of these Provisions shall be designed, installed, and approved in accordance with applicable codes and standards referenced in Chapter 2.

4.3 General Requirements

4.3.1 Authority Having Jurisdiction (AHJ)

4.3.1.1 AHJ shall determine whether these Provisions are met.

4.3.2 Historic Structures and Cultural Resource Buildings. The provisions of these Provisions shall be permitted to be modified by AHJ in consultation with Auqaf and Archeological Departments for buildings or structures identified and classified as historic structures in accordance with Section 14.16.

4.3.3 Fire Certificate

The owner shall obtain fire certificate from AHJ after every three years.

4.3.3.1 The fire certificate shall attest that the building features, systems, and use have been inspected and confirmed to remain consistent with Code specifications.

4.3.4 Construction, Repair, and Improvement Operations

4.3.4.1 Buildings or portions of buildings shall be permitted to be occupied during construction, repair, alterations, or additions only where required means of egress and required fire protection features are in place.

4.3.4.2 Escape Facilities

4.3.4.2.1 In buildings under construction, adequate escape facilities shall be maintained at all times for the use of construction workers.

4.3.4.2.2 Escape facilities shall consist of doors, walkways, stairs, ramps, fire escapes, ladders arranged in accordance with the general principles of the Code.

4.3.5 Changes of Occupancy

4.3.5.1 In any building or structure, whether or not a physical alteration is needed, a change from one occupancy classification to another shall be permitted only where such a structure, building, or portion thereof conforms with the requirements of these Provisions that apply to new construction for the proposed new use.

4.3.6 Maintenance, Inspection, and Testing

4.3.6.1 Whenever or wherever any device, equipment, system, condition, arrangement, level of protection, fire-resistive construction, or any other feature is required for compliance with the provisions of these Provisions, such device, equipment, system, condition, arrangement, level of protection, fire-resistive construction, or other feature shall thereafter be continuously maintained.

4.3.6.2 Existing life safety features that do not meet the requirements for new buildings, but that exceed the requirements for existing buildings, shall not be further diminished.

4.3.6.3 Any device, equipment, system, condition, arrangement, level of protection, fire-resistive construction, or another feature requiring periodic testing, inspection, or operation to ensure its maintenance shall be tested, inspected, or operated as specified elsewhere in these Provisions.

4.4 Fire Zones

4.4.1 Demarcation

4.4.1.1 The city or area under the jurisdiction of AHJ shall for the purpose of these provisions, be demarcated into distinct zones, based on fire hazard inherent in the buildings and structures according to occupancy, which shall be called as 'Fire Zones'.

4.4.2 Number and Designation of Fire Zones

4.4.2.1 The number of fire zones in a city or area under the jurisdiction of AHJ depends upon the existing layout, types of building construction, classification of existing buildings based on occupancy and expected future development of the city or area. In large cities or areas, three fire zones may be necessary, while in smaller ones, one or two may be adequate.

4.4.2.2 The fire zones shall make use of in-land use development plan and shall be designated as follows.

4.4.2.2.1 Fire Zone No. 1. This shall comprise areas having assembly, educational, health care, day care, residential, detention and correctional, and mercantile buildings, or areas which are under development for such occupancies.

4.4.2.2.2 Fire Zone No. 2. This shall comprise business and industrial buildings, except high hazard industrial buildings or areas which are under development for such occupancies.

4.4.2.2.3 Fire Zone No. 3. This shall comprise areas having high hazard industrial buildings, storage buildings and buildings for hazardous use or areas which are under development for such occupancies.

4.5 Change in Fire Zone Boundaries

4.5.1 When the boundaries of any fire zone are changed, or when it is intended to include other areas or types of occupancies in any fire zone, it shall be done by following the same procedure as for promulgating new rules or ordinances or both.

4.6 Overlapping Fire Zones

4.6.1 When any building is so situated that it extends to more than one fire zone, it shall be deemed to be in the fire zone in which the major portion of the building or structure is situated.

4.6.2 When any building is so situated that it extends equally to more than one fire zone, it shall be deemed to be in the fire zone having more hazardous occupancy buildings.

4.7 Temporary Buildings or Structures

4.7.1 Temporary buildings and structures shall be permitted only in Fire Zones No. 1 and 2 as the case may be, according to the purpose for which these are to be used, by special permit from AHJ for a limited period and subject to such conditions as may be imposed in the permit.

4.7.2 Such buildings and temporary structures shall be completely removed on the expiry of the period specified in the permit.

4.8 Restrictions on Type of Construction for New Buildings

4.8.1 Buildings erected in Fire Zone No. 1 shall conform to construction of Type I, II, III, IV or V.

4.8.2 Buildings erected in Fire Zone No. 2 shall conform to construction of Type I, II or III.

4.8.3 Buildings erected in Fire Zone No. 3 shall conform to construction Type I or II.

Chapter 5 Classification of Occupancy

5.1 Classification of Occupancy

5.1.1 General

5.1.1.1 Occupancy Classification. The occupancy of a building or structure, or portion of a building or structure, shall be classified in accordance with 5.1.2 through 5.1.13. Occupancy classification shall be subject to the ruling of AHJ where there is a question of proper classification in any individual case.

5.1.1.2 Special Structures. Occupancies in special structures shall conform to the requirements of Section 14.17.

5.1.2 Assembly. For requirements, see Section 14.1.

5.1.2.1 Definition — Assembly Occupancy. An occupancy (1) used for a gathering of 50 or more persons for deliberation (lectures, discussions, examinations, seminars, workshops, conferences and similar uses), worship, entertainment, eating, amusement, awaiting transportation, or similar uses; or (2) used as a special amusement building, regardless of occupant load.

5.1.3 Educational. For requirements, see Section 14.2.

5.1.3.1 Definition — Educational Occupancy. An occupancy used for educational and training purposes by six or more persons for 4 or more hours per day or more than 12 hours per week.

5.1.3.2 Other Occupancies. Other occupancies associated with educational institutions shall be in accordance with the appropriate parts of these Provisions.

5.1.3.3 Incidental Instruction. In cases where instruction is incidental to some other occupancy, the section of these Provisions governing such other occupancy shall apply

5.1.4 Day Care. For requirements, see Section 14.3.

5.1.4.1 Definition — Day-Care Occupancy. An occupancy in which four or more clients receive care, maintenance, and supervision, by other than their relatives or legal guardians, for less than 24 hours per day.

5.1.5 Health Care. For requirements, see Section 14.4.

5.1.5.1 Definition — Health Care Occupancy. An occupancy used to provide medical or other treatment or care simultaneously to four or more patients.

5.1.6 Detention and Correctional. For requirements, see Section 14.6.

5.1.6.1 Definition—Detention and Correctional Occupancy. An occupancy used to house one or more persons under varied degrees of restraint or security where such occupants are mostly incapable of self-preservation because of security measures not under the occupants' control.

5.1.6.2 Nonresidential Uses. Within detention and correctional facilities, uses other than residential housing shall be in accordance with the appropriate chapter of these Provisions.

5.1.7 Residential. For requirements, see Sections 14.7 through 14.11.

5.1.7.1 Definition — Residential Occupancy. An occupancy that provides sleeping accommodations for purposes other than health care or detention and correctional.

5.1.7.1.1 Definition—One- and Two-Family Dwelling Unit. A building that contains not more than two dwelling units (one and two family houses) with independent cooking and bathroom facilities.

5.1.7.1.2 Definition — Lodging or Rooming House. A building or portion thereof that does not qualify as a one or two family dwelling, that provides sleeping accommodations for total of 16 or fewer people on a transient or permanent basis, without personal care services, with or without meals, but without separate cooking facilities for individual occupants.

5.1.7.1.3 Definition — Hotel. A building or groups of buildings under the same management in which there are sleeping accommodations for more than 16 persons and primarily used by transients for lodging with or without meals.

5.1.7.1.4 Definition — Dormitory. A building or a space in a building in which group sleeping accommodations are provided for more than 16 persons who are not members of the same family in one room, or a series of closely associated rooms, under joint occupancy and single management, with or without meals, but without individual cooking facilities.

5.1.7.1.5 Definition—Apartment Building. A building or portion thereof exceeding 9 m (30 ft) in height or five dwelling units with independent cooking and bathroom facilities.

5.1.8 Residential Board and Care. For requirements, see Section 14.7.

5.1.8.1 Definition—Residential Board and Care Occupancy

An occupancy used for lodging and boarding of four or more residents, not related by blood or marriage to the owners or operators, for the purpose of providing personal care services.

5.1.9 Mercantile. For requirements, see Section 14.12.

5.1.9.1 Definition — Mercantile Occupancy. An occupancy used for the display and sale of merchandise.

5.1.10 Business. For requirements, see Section 14.13.

5.1.10.1 Definition — Business Occupancy. An occupancy used for the transaction of business other than mercantile.

5.1.11 Industrial. For requirements, see Section 14.15.

5.1.11.1 Definition — Industrial Occupancy. An occupancy in which products are manufactured or in which processing, assembling, mixing, packaging, finishing, decorating, or repair operations are conducted.

5.1.12 Storage. For requirements, see Section 14.16.

5.1.12.1 Definition — Storage Occupancy. An occupancy used primarily for the storage or sheltering of goods, merchandise, products, vehicles, or animals.

5.1.13 Multiple Occupancies

5.1.13.1 Definitions

5.1.13.1.1 Multiple Occupancy. A building or structure in which two or more classes of occupancy exist.

5.1.13.1.2 Mixed Occupancy. A multiple occupancy where the occupancies are intermingled.

5.1.13.1.3 Separated Occupancy. A multiple occupancy where the occupancies are separated by fire resistance-rated assemblies.

5.1.13.1.4 Where exit access from an occupancy traverses another occupancy, the multiple occupancy shall be treated as a mixed occupancy.

5.1.13.2 Mixed Occupancies

5.1.13.2.1 Each portion of the building shall be classified as to its use in accordance with Section 5.1.

5.1.13.2.2 The building shall comply with the most restrictive requirements of the occupancies involved

5.1.13.3 Separated Occupancies

5.1.13.3.1 Where separated occupancies are provided, each part of the building comprising a distinct occupancy, as described in this chapter, shall be completely separated from other occupancies by fire-resistive assemblies of two hours fire rating.

5.1.13.3.2 Two hour fire resistance rating specified in Section 5.1.13.3.1 shall be permitted to be reduced to 1 hour, where the building is protected throughout by an approved automatic sprinkler system in accordance with Section 9.3.

5.1.13.3.3 Occupancy separations shall be vertical, horizontal, or both or, when necessary, of such other form as required to provide complete separation between occupancy divisions in the building.

5.1.13.3.4 In multiple occupancies**,** where certain areas within a predominant occupancy are used for following purposes, provided each of the following area is less than 10 percent of the total area of predominant occupancy, shall be permitted to be considered part of the predominant occupancy and shall be subject to the provisions of these Provisions that apply to the predominant occupancy, and no fire resistive separation will be required:

(1) Mercantile, business, industrial, or storage use

(2) Nonresidential use with an occupant load fewer than that established by Section 5.1 for the occupancy threshold.

Chapter 6 General Safety Requirements

6.1 Fundamental Requirements

6.1.1 Every new and existing building or structure shall be constructed, arranged, equipped, maintained, and operated in accordance with these Provisions so as to provide a reasonable level of life safety, property protection, and public welfare from the actual and potential hazards created by fire.

6.1.2 Structural Hazards. AHJ shall have the authority to prohibit any or all open flames or other sources of ignition where circumstances make such conditions hazardous.

6.1.3 Listed/approved and Labeled. Listed/approved and labeled equipment, devices, and materials shall be installed and used in accordance with the listing limitations and the manufacturers' instructions.

6.2 Owner/Occupant Responsibilities

6.2.1 The owner, operator, lessee or occupant shall be responsible for compliance with these Provisions.

6.2.2 The owner, operator, lessee or occupant of a building shall notify AHJ prior to a change of occupancy as specified in Section 4.3.5.

6.2.3 AHJ shall be permitted to require the owner, operator, or occupant to provide tests or test reports, without expense to AHJ, as proof of compliance with the intent of these Provisions.

6.2.4 The owner, operator, or occupant of a building that is deemed unsafe by AHJ shall abate, through corrective action approved by AHJ, the condition causing the building to be unsafe either by repair, rehabilitation, or other corrective action approved by AHJ.

6.2.5 The owner, operator, or occupant, or any person in control of a building or premises shall keep records of all maintenance, inspections, and testing of fire protection systems, fire alarm systems, smoke control systems, emergency evacuation and relocation drills, emergency action plans, emergency power, elevators, and other equipment as required by AHJ.

6.2.6 All records required to be kept shall be maintained until their useful life has been served, as required by law, or as required by AHJ.

6.2.7 All records shall be maintained in hard copy and electronically at different places/location (such as email boxes, Google directory, portable hard disk, etc) to ensure that these remain safe in case of event of fire and shall be produced to AHJ.

6.3 Occupancy

6.3.1 No new construction shall be occupied in whole or in part in violation of these Provisions.

6.3.2 Existing buildings that are occupied at the time of adoption of these Provisions shall remain in use provided that the following conditions are met:

(1) The occupancy classification remains the same.

(2) No condition deemed hazardous to life or property exists that would constitute an imminent danger.

6.3.3 Buildings or portions of buildings, except for routine maintenance or repair, shall not be occupied during construction, repair, or alteration without the approval of AHJ if required means of egress are impaired or required fire protection systems are out of service.

6.3.4 A high rise building during construction shall be provided with the following fire protection measures, which shall be maintained in good working condition at all the times

(1) Dry riser of minimum 100 mm (4 in.) diameter pipe with hydrant outlets on the floors constructed with a fire service inlet to boost the water in the dry riser and maintenance should be as per the acceptable standards.

(2) Drums filled with water of 2000 litres capacity with two fire buckets on each floor; and a water storage tank of minimum 20000 litres capacity, which may be used for other construction purposes also.

6.4 Building Evacuation

6.4.1 Persons shall not fail to leave a building when notified to do so or when directed by AHJ as a result of a known or perceived fire emergency.

6.4.2 Persons shall not fail to leave any overcrowded premises when ordered to do so by AHJ.

6.4.3 Persons shall not fail to leave a building when a fire alarm system is activated, unless otherwise provided for in an approved building fire evacuation plan or during routine testing or maintenance.

6.5 Fire Drills

6.5.1 Where Required. Emergency egress and relocation drills conforming to these Provisions shall be conducted as specified by the provisions of Chapter 10 of these Provisions. Drills shall be designed in cooperation with the local authorities.

6.5.2 Drill Frequency. Emergency egress and relocation drills, shall be conducted at the frequency specified for different occupancies in Chapter 10 of these Provisions.

6.5.3 Simulated Conditions. Drills shall be held at expected and unexpected times and under varying conditions to simulate the unusual conditions that can occur in an actual fire emergency.

6.5.4 Relocation Area. Drill participants shall relocate to a predetermined location and remain at such location until a recall or dismissal signal is given.

6.5.5 A written record of each drill shall be completed by the person responsible for conducting the drill and maintained in an approved manner and as specified in Section 6.2.7.

6.6 Reporting of Fires

6.6.1 The person discovering any unwanted fire, regardless of magnitude, shall immediately notify the fire department, as well as owner, manager and occupant.

6.6.2 Facilities that have established on-premises firefighting organizations and have coordinated and arranged procedures approved by AHJ shall not need to notify the fire department.

6.6.3 The owner, manager, occupant, or any person in control of such building or premises, upon discovery of an unwanted fire or evidence of a previous unwanted fire that had apparently been extinguished, shall immediately notify the fire department.

6.7 Tampering with Fire Safety Equipment

6.7.1 Persons shall not render any portable or fixed fire extinguishing system or device or any fire-warning system or device inoperative or inaccessible.

6.8 Emergency Action Plans

6.8.1 Where Required. Emergency action plans shall be provided for high-rise, assembly, special amusement buildings, health care, day-care centers, residential board and care, hotels and dormitories, detention and correctional, industrial, storage, mercantile, educational occupancies, underground and window less structures or where required by AHJ.

6.8.2 Plan Requirements

6.8.2.1 Emergency plans shall include the following:

(1) Procedures for reporting of emergencies

(2) Occupant and staff response to emergencies

(3) Evacuation, relocation and shelter-in-place procedures appropriate to the building, its occupancy, emergencies, and hazards

(4) Appropriateness of the use of elevators

(5) Design and conduct of fire drills

(6) Type and coverage of building fire protection systems

(7) Formation of emergency response teams

(8) Other items required by AHJ

6.8.2.2 Emergency action plans shall be submitted to AHJ for review when required by AHJ.

6.8.2.3 Emergency action plans shall be reviewed and updated as required by AHJ.

6.9 Smoking

6.9.1 Where smoking is considered a fire hazard, AHJ shall be authorized to order the owner in writing to post "No Smoking" signs on conspicuous locations.

6.9.2 In areas where smoking is permitted, noncombustible ashtrays shall be provided.

6.10 Open Flames, Candles Open Fires, and Incinerators

6.10.1 Permits. Permits, where required, shall comply with Section 1.12.

6.10.1.1 Permits shall not be required for cooking and recreational fires unless specified otherwise.

6.10.1.2 Where burning is conducted on public property or the property of someone other than the permit applicant, the permit applicant shall demonstrate that permission has been obtained from the appropriate government agency, the owner, or the owner's authorized agent.

6.10.2 AHJ shall have the authority to prohibit any open flames, candles, recreational and cooking fires or other sources of ignition, or require special provisions on the use of any form of fire or smoking material where circumstances make such conditions hazardous.

6.10.3 Outdoor Fires

6.10.3.1 Outdoor fires shall not be built, ignited or maintained in or upon hazardous fire areas, except by permit from AHJ.

6.10.3.2 Permanent barbecues, portable barbecues, outdoor fire places, or grills shall not be used for the disposal of rubbish, trash, or combustible waste material.

6.10.4 Open Fires

6.10.4.1 Permitted open fires shall be located not less than 50 ft (15 m) from any structure.

6.10.4.2 Burning hours shall be prescribed by AHJ.

6.10.4.3 Recreational fires shall not be located within 25 ft (7.6 m) of a structure or combustible material unless contained in an approved manner.

6.10.4.4 Conditions that could cause a fire to spread to within 25 ft (7.6 m) of a structure shall be eliminated prior to ignition.

6.10.5 Fire Attendant

6.10.5.1 Open, recreational and cooking fires shall be constantly attended by a competent person until such fire is extinguished.

6.10.5.2 This person shall have a garden hose connected to the water supply or other fire-extinguishing equipment readily available for use.

6.10.6 Incinerators and Fire places

6.10.6.1 Incinerators, outdoor fire places, permanent barbecues and grills shall not be built, installed or maintained without prior approval of AHJ.

6.10.7 Open-Flame Devices

6.10.7.1 Welding torches, tar pots, decorative torches, and other devices, machines, or processes liable to start or cause fire shall not be operated or used in or upon any areas, except by permit from AHJ.

6.11 Fire Protection Markings

6.11.1 Shaftways and stairway shall be marked for safety of fire fighters.

6.11.2 Every outside opening accessible to the fire department that opens directly on any hoistway or shaftway communicating between two or more floors in a building shall be plainly marked with a sign in accordance with 6.11.3 and 6.11.4.

6.11.3 Shaftway signs shall be in red letters at least 6 in. (152 mm) high on a white background stating "SHAFTWAY."

6.11.4 Such warning signs shall be placed so as to be readily discernible from the outside of the building.

6.11.5 New enclosed stairs serving three or more stories and existing enclosed stairs serving five or more stories shall have clear marking stating floor level, exit direction, terminus of top and bottom, and be visible and easily readable.

6.12 Combustible Exterior Vegetation

6.12.1 Cut or uncut weeds, grass, vines, and other vegetation shall be removed when determined by AHJ to be a fire hazard.

6.12.2 When AHJ determines that total removal of growth is impractical due to size or environmental factors, approved fuel breaks shall be installed and maintained.

6.12.3 Designated areas shall be cleared of combustible vegetation to establish the fuel breaks.

6.13 Special Outdoor Events, Carnivals, and Fairs

6.13.1 Permits. Permits, where required, shall comply with Section 1.12.

6.13.2 AHJ shall be permitted to regulate all outdoor events such as carnivals and fairs as it pertains to access for emergency vehicles; access to fire protection equipment; placement of stands, concession booths, and exhibits; and the control of hazardous conditions dangerous to life and property. AHJ shall be permitted to order a life safety evaluation.

6.13.3 Life safety evaluations shall include an assessment of all of the following conditions and related appropriate fire safety measures:

(1) Nature of the events and the participants and attendees

(2) Access and egress movement, including crowd management

(3) Medical emergencies

(4) Fire hazards

(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) Relationships among facility management, event participants, emergency response agencies, and others having a role in the events accommodated in the facility

6.13.4 Life Safety Evaluation. Life safety evaluation shall be carried out in accordance with the following.

6.13.4.1 Life Safety Narrative. The owner shall provide life safety narrative to AHJ, describing the following:

(1) Building occupancy, construction type, and intended uses and events

(2) Building area and population capacity of the proposed facility

(3) Principal fire and life safety features/strategies for the building, including the following:

(a) Sprinkler protection

(b) Smoke control/protection

(c) Fire alarm - visual and audible

(d) PA system

(e) Emergency power and lighting

(f) Provisions for patrons with disabilities

(g) Fire department access

(h) Fire/Emergency command center

(4) Exterior construction design parameters used/applied

6.13.4.2 Facility Management and Operational Plans. Facility management and operational plans shall address the following:

(1) Best practices adopted or recognized

(2) Emergency plans

(3) Evacuation plans

(4) Shelter-in-place plans, including capacities and protection considerations

(5) Crowd management training plans

(6) Safety plans, which include the following:

(a) Training plans

(b) Safety equipment plans

(7) Fire alarm, smoke system protocol and testing plans

(8) First aid or medical treatment plans, which include the following:

(a) Defined levels of service

(b) Standing orders adopted

(c) Supply and equipment plan

(9) Housekeeping plans – biological, medical, hazardous materials cleaning

(10) Emergency communication plans, which include the following:

(a) Chain of authority and incident command system employed

(b) Contact information for the following:

i. Venue personnel

ii. Emergency management and response organizations

(e.g., fire, police, medical, utility, transportation, key stakeholders)

(c) Communication systems

(d) Standard announcement for incidents or emergency situations

(11) Risk and threat assessment for venue and surrounding area for the following:

(a) Severe weather

(b) Hazardous materials

(c) Terrorism

(d) Hostile intruder

(12) Operating procedures and protocols for risks, such as the following:

(a) Severe weather preparedness and monitoring plans

(b) Hazardous materials incidence response plans

(c) Terrorism response plans

(d) Hostile intruder response plans

(13) First responder response/arrival routes plans

(14) Alcohol management plans

(15) Food safety plans

(16) Rigging and temporary performance structure, which includes the following:

(a) Design and safety review plans

(b) Emergency action plans

(17) Chemical and hazardous materials information and data

(18) Barrier and wall protection plans for motor sports or similar events

6.13.4.3 Records. Records of the facility management plans, including procedures and location, shall be maintained, for the following:

(1) Crowd management training

(2) Safety training

(3) Fire alarm, smoke system maintenance and test records

(4) First aid or medical treatment and regulation compliance

6.14 Outside Storage

6.14.1 Outside storage of combustible materials shall not be located within 10 ft (3 m) of a property line.

6.14.2 The separation distance shall be allowed to be reduced to 3 ft (0.9 m) for storage not exceeding 6 ft (1.8 m) in height.

6.14.3 Combustible material shall not be stored beneath a building or structure unless specifically constructed or protected for this purpose.

6.14.4 Combustible storage in the open shall not exceed 20 ft (6.1 m) in height.

6.15 Storage of Combustible Materials

6.15.1 Permits. Permits, where required, shall comply with Section 1.12.

6.15.2 Ceiling Clearance

6.15.2.1 Storage shall be maintained 2 ft (0.61 m) or more from the ceiling in non sprinklered areas of buildings.

6.15.2.2 Shelving, and any storage thereon, directly below the sprinklers shall not extend above a plane located 18 in. (457 mm) below the ceiling sprinkler deflectors.

6.15.2.2 Where other standards specify greater clearance to storage minimums, they shall be followed.

6.15.3 Means of Egress. Combustible material shall not be stored in exits.

6.15.4 Equipment Rooms. Combustible material shall not be stored in boiler rooms, mechanical rooms, network rooms or electrical equipment rooms.

6.15.5 Materials and supplies for the operation and maintenance of the equipment in the room shall be permitted.

6.15.6 Attic, Under-Floor, and Concealed Spaces. No combustible material shall be stores in Attic, Under-Floor, and Concealed Spaces.

6.15.7 Fueled Equipment. Fueled equipment, including but not limited to motorcycles, mopeds, lawn-care equipment, and portable cooking equipment, shall not be stored, operated, or repaired within a building except under one of the following conditions:

(1) The building or room has been constructed for such use in accordance with the building code.

(2) The use is allowed by other clauses of these Provisions.

6.16 Indoor Children's Playground Structures

6.16.1 Structures intended as children's playgrounds, installed indoors and that which exceed 10 ft (3.1 m) in height and 160 ft^2 (14.9 m^2) in area, shall comply with the specifications in Sections 6.17.2 through 6.17.6

6.16.2 Indoor children's playground structures, constructed of combustible materials (light-transmitting plastics, foam plastics, aluminum composite material, textiles and films etc.), shall be provided with supervised, automatic sprinkler system in accordance with Section 9.3.

6.16.3 Interior wall and ceiling finish shall be Class A or Class B.

6.16.4 Interior floor finish shall be Class I or Class II.

6.16.5 Indoor children's playground structures shall have a minimum horizontal separation from other structures of 20 ft (6.1 m).

6.16.6 Indoor children's playground structures shall not exceed 300 ft^2 (28 m^2) in area, unless approved by AHJ.

Chapter 7 Building Services

7.1 Electrical Fire Safety

7.1.1 General. Section 7.1 shall apply to permanent and temporary electrical appliances, equipment, fixtures, and wiring. Existing installations shall be permitted to be continued in use provided non conformity does not present an imminent hazard.

7.1.2 Permanent Wiring, Fixtures, and Equipment

7.1.2.1 All new electrical wiring, fixtures, appliances and equipment shall be installed in accordance with NFPA 70 or any approved code/standard.

7.1.2.2 Unless determined to present an imminent danger, existing electrical wiring, fixtures, appliances, and equipment hall be permitted to be maintained in accordance with the accepted standards.

7.1.2.3 Permanent wiring abandoned in place shall be tagged or otherwise identified at its termination and junction points as "Abandoned in Place" or removed from all accessible areas and insulated from contact with other live electrical wiring or devices.

7.1.3 Multiplug Adapters

7.1.3.1 Multiplug adapters, such as multiplug extension cords, cube adapters, strip plugs, and other devices, shall be listed/approved and used in accordance with their listing.

7.1.3.2 Multiplug adapters shall not be used as a substitute for permanent wiring or receptacles.

7.1.4 Relocatable Power Taps

7.1.4.1 Relocatable power taps shall be of the polarized or grounded type with over current protection and shall be listed/approved.

7.1.4.2 The relocatable power taps shall be directly connected to a permanently installed receptacle.

7.1.4.3 Relocatable power tap cords shall not extend through walls, ceilings, or floors; under doors or floor coverings; or be subject to environmental or physical damage.

7.1.5 Extension Cords

7.1.5.1 Extension cords shall be plugged directly into an approved receptacle, power tap, or multiplug adapter and shall, except for approved multiplug extension cords, serve only one portable appliance.

7.1.5.2 The ampacity of the extension cords shall not be less than the rated capacity of the portable appliance supplied by the cord.

7.1.5.3 The extension cords shall be maintained in good condition without splices, deterioration, or damage.

7.1.5.4 Extension cords shall be grounded when servicing grounded portable appliances.

7.1.5.5 Extension cords and flexible cords shall not be affixed to structures; extend through walls, ceilings, or floors, or under doors or floor coverings; or be subject to environmental or physical damage.

7.1.5.6 Extension cords shall not be used as a substitute for permanent wiring.

7.1.6 Temporary Installations.

7.1.6.1 Scope. The provisions of Section 7.1.6 shall apply to temporary electric power and lighting installations.

7.1.6.2 All Wiring Installations

7.1.6.2.1 Other Articles. All requirements of NFPA 70 or any approved code/standard for permanent wiring shall apply to temporary wiring installations.

7.1.6.2.2 Approval. Temporary wiring methods shall be acceptable only if approved based on the conditions of use and any special requirements of the temporary installation.

7.1.6.3 Time Constraints

7.1.6.3.1 During the Period of Construction. Temporary electric power and lighting installations shall be permitted during the period of construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities.

7.1.6.3.2 Removal. Temporary wiring shall be removed immediately upon completion of construction or purpose for which the wiring was installed.

7.1.7 Building Disconnect

7.1.7.1 Identification of Disconnecting Means

7.1.7.1.1 Each disconnecting means shall be legibly marked to indicate its purpose unless located and arranged so the purpose is evident. The marking shall be of sufficient durability to withstand the environment involved.

7.1.8 Covers. All panel board and switchboards, pull boxes, junction boxes, switches, receptacles, and conduit bodies shall be provided with covers compatible with the box or conduit body construction and suitable for the conditions of use.

7.2 Heating, Ventilation, and Air-Conditioning

7.2.1 Air-Conditioning, Heating, Ventilating Ductwork, and Related Equipment. Air-conditioning, heating, ventilating duct work, and related equipment shall be in accordance with NFPA 90A/NFPA 90B or any other approved code/standard. Existing installations shall be permitted to be continued in service provided these do not present imminent danger to life

7.2.2 Ventilating or Heat-Producing Equipment

7.2.2.1 Air-conditioning and ventilating systems shall be so installed and maintained as to minimize the danger of spread of fire, smoke or fumes from one floor to other or from outside to any occupied building or structure

7.2.2.2 Air-conditioning and ventilating systems circulating air to more than one floor or fire area shall be provided with dampers designed to close automatically in case of fire and thereby preventing spread of fire or smoke and shall be in accordance with the any approved code/standard. Such a system shall also be provided with automatic controls to stop fans in case of fire, unless arranged to remove smoke from a fire, in which case these shall be designed to remain in operation.

7.2.2.3 Air-conditioning system serving large places of assembly (over 500 persons), large departmental stores or hotels with over 50 rooms in a single block shall be provided with effective means for preventing circulation of smoke through the system in the case of a fire in air filters or from other sources drawn into the system, and shall have smoke sensitive devices for actuation in accordance with the accepted standards.

7.2.2.4 From fire safety point of view, separate air handling units for various floors shall be provided so as to avoid the hazards arising from spread of fire and smoke through the air-conditioning ducts. The requirements of air-conditioning ducts shall be in accordance with good practice.

7.2.2.5 Pipe and duct insulation and covering, duct linings, vapour retarded spacing, adhesive, fasteners, tapes and supplementary material added to duct plenums, panels and duct silencers used in duct system shall have, in the form in which they are used, a maximum flame index of 25 without evidence of continued progressive combustion and a maximum smoke developed index of 50.

7.3 Elevators, Escalators, and Conveyors

7.3.1 Fire Fighters' Emergency Operations

7.3.1.1 All new elevators shall conform to the Fire Fighters Emergency Operations requirements.

7.3.2 Elevator Machine Rooms. Elevator machine rooms that contain solid-state equipment for elevators, other than existing elevators, having a travel distance exceeding 50 ft (15 m) above the level of exit discharge or exceeding 30 ft (9.1 m) below the level of exit discharge shall be provided with independent ventilation or air-conditioning systems to maintain temperature during fire fighters' emergency operations for elevator operation (see 7.3.1). The operating temperature shall be established by the elevator equipment manufacturer's specifications. When standby power is connected to the elevator, the machine room ventilation or air-conditioning shall be connected to standby power.

7.3.3 Elevator Testing

7.3.3.1 Elevators shall be subject to periodic inspections and tests

7.3.4 Openings to Exit Enclosures. Conveyors, elevators, dumb waiters, and pneumatic conveyors serving various stories of a building shall not open to an exit enclosure.

7.3.5 Standardized Fire Service Elevator Keys

7.3.5.1 Buildings with elevators equipped with Phase I emergency call, Phase II emergency in-car operation, or a fire service access elevator shall be equipped to operate with a standardized fire service key.

7.3.5.2 Existing buildings with elevators equipped with Phase I emergency recall or Phase II emergency in-car operation shall be permitted to comply with Section 7.3.5.3.

7.3.5.3 Existing Buildings. Existing buildings shall be incompliance with the provisions mentioned in this chapter after a period as stipulated elsewhere in these Provisions.

7.4 Utilities. Equipment using fuel gas and related gas piping should be in accordance with NFPA 54/or NFPA58 or any approved code/standard.

7.4.1 Existing installations shall be permitted to be continued in service, subject to approval by AHJ.

7.4.2 Above ground gas meters, regulators, and piping exposed to vehicular damage shall be protected.

7.5 Heating Appliances

7.5.1 General.

7.5.1.1 The installation, maintenance and operation of stationary liquid fuel–burning appliances, including but not limited to industrial-, commercial-, and residential-type steam,

hot water, or warm air heating appliances; domestic-type range burners; space heaters; and portable liquid fuel–burning equipment shall be in accordance with NFPA 31 or any approved code/standard.

7.5.1.2 All heating appliances shall be listed/approved.

7.5.1.3 Acceptable Liquid Fuels

7.5.1.3.1 The type and grade of liquid fuel used in a liquid fuel–burning appliance shall be that liquid fuel for which the appliance is listed/approved or is stipulated by the manufacturer.

7.5.1.3.2 Crankcase oil or used oil shall not be used as fuel

7.5.2 Kerosene Burners and Oil Stoves

7.5.2.1 Kerosene burners and oil stoves shall be equipped with a primary safety control furnished as an integral part of the appliance by the manufacturer to stop the flow of oil in the event of flame failure. Barometric oil feed shall not be considered a primary safety control.

7.5.2.2 A conversion range oil burner shall be equipped with a thermal (heat-actuated) valve in the oil supply line, located in the burner compartment of the stove.

7.5.2.3 Only listed/approved kerosene heaters shall be used. The following safe guards shall apply:

(1) Provide adequate ventilation

(2) Do not place on carpeting

(3) Keep 3 ft (0.9 m) away from combustible furnishings or drapes

(4) Use only approved Type 1-K water clear kerosene

(5) Allow to cool before refueling

7.5.2.4 AHJ shall be permitted to prohibit use of portable kerosene burners and oil stoves in occupancies or situations where such use or operation will present an undue danger to life or property.

7.5.3 Portable Electric/Gas Heater

7.5.3.1 AHJ shall be permitted to prohibit use of portable electric/gas heaters in occupancies or situations where such use or operation would present an undue danger to life or property.

7.5.3.2 Portable electric/gas heaters shall be designed and located so that they cannot be easily overturned.

7.5.3.3 All portable electric heaters shall be listed/approved.

7.5.4 Vents. All chimneys, smokestacks, or similar devices for conveying smoke or hot gases to the outer air and the stoves, furnaces, incinerators, boilers, or any other heat-producing devices or appliances shall be installed and maintained.

7.6 Waste Chutes, Incinerators, and Laundry Chutes

7.6.1 Enclosure

7.6.1.1 Waste chutes and laundry chutes shall be separately enclosed by walls or partitions.

7.6.1.2 Chute intake openings shall be protected

7.6.1.3 The doors of chutes shall open only to a room that is designed and used exclusively for accessing the chute opening.

7.6.1.4 Chute service opening rooms shall be separated from other spaces.

7.7 Stationary Generators and Standby Power Systems

7.7.1 Stationary Combustion Engines and Gas Turbines Installation. Stationary generator sets shall be installed in accordance with NFPA 37 and NFPA 70 or any approved code/standard.

7.7.2 Portable Generators

7.7.2.1 Portable generators shall be operated, refueled and maintained outside the building or in a protected area.

7.7.2.1.1 Portable generators shall be permitted to be operated or refueled in a building or room that has been constructed for such use in accordance with the building code.

7.7.2.1.2 Fueling from a container shall be permitted when the engine is shut down and engine surface temperature is below the auto ignition temperature of the fuel.

7.7.2.2 Portable generators shall be positioned so that the exhaust is directed as follows:

(1) At least 5 ft (1.5 m) in any direction away from any openings or air intakes

(2) Away from the building

7.7.2.3 AHJ shall be permitted to prohibit use of portable generators in occupancies or situations where such use or operation will present an undue danger to life or property.

7.7.3 Emergency and Legally Required Standby Power Systems

7.7.3.1 General. New stationary generators for emergency use or for legally required standby power required by these Provisions, the building code, or other codes and standards shall be installed in accordance with NFPA 110 or any approved code/standard.

7.8 Smoke Control

7.8.1 Newly installed smoke-control systems shall be inspected by AHJ and tested in accordance with the criteria established in the approved design documents, NFPA 204 and NFPA 92 or any approved code/standard.

7.8.2 Smoke-control systems shall have an approved maintenance and testing program to ensure operational integrity in accordance with this section. Components of such systems shall be operated, maintained, and tested in accordance with their operation and maintenance manuals.

7.8.2.1 Testing. Operational testing of the smoke-control system shall be in accordance with NFPA 92 or any approved code/standard, and shall include all equipment related to the system including, but not limited to, initiating devices, fans, dampers, controls, doors, and windows.

7.8.2.2 Test records shall be maintained on the premises and must indicate the date of such testing, the qualified service personnel, and any corrective measures needed or taken.

7.8.3 All smoke-control systems and devices shall be maintained in a reliable operating condition and shall be replaced or repaired where defective.

7.9 Smoke Venting

7.9.1 Smoke venting facilities for safe use of exits in windowless buildings, underground structures, large area factories, hotels and assembly buildings (including cinema halls) shall be automatic in action with manual controls in addition.

7.9.2 Natural draft smoke venting shall utilize roof vents or vents in walls at or near the ceiling level; such vents shall be normally open, or, if closed, shall be designed for automatic opening in case of fire, by release of smoke sensitive devices.

7.9.3 Where smoke venting facilities are installed for purposes of exit safety, these shall be adequate to prevent dangerous accumulation of smoke during the period of time necessary to evacuate the area served, using available exit facilities with a margin of safety to allow for unforeseen contingencies. It is recommended that smoke exhaust equipment should have a minimum capacity of 12 air changes per hour. Where mechanical venting is employed, it shall be fire safe.

7.10 Emergency Command Center

Where required, emergency command centers shall comply with Section 7.10.

7.10.1 The emergency command center shall be separated from the remainder of the building by a fire barrier having a fire resistance rating of not less than 1 hour.

7.10.2 The emergency command center room shall be a minimum of 96 ft^2 (8.9 m^2) with a minimum dimension of 8 ft (2.4 m).

7.10.3 The following shall be provided in the emergency command center:

(1) The fire department communication unit

(2) Schematic building plans indicating the typical floor plan and detailing the building core means of egress, fire protection systems, fire-fighting equipment, and fire department access

(4) Work table

(5) If applicable, hazardous material management plans for the building

7.10.4 Where otherwise required, the following devices or functions shall be provided within the emergency command center:

(1) The emergency voice/alarm communication system unit

(2) Fire detection and alarm system annunciator unit

(3) Annunciator visually indicating the location of the elevators and whether they are operational

(4) Status indicators and controls for air-handling systems

(5) Controls for unlocking stairway doors simultaneously

(6) Sprinkler valve and water flow detector display panels

(7) Emergency and standby power status indicators

(8) Fire pump status indicators

(9) Generator supervision devices and manual start and transfer features

(10) Public address system, where specifically required by other sections of these Provisions

(11) Controls required for smoke control

7.10.5 Emergency Command Center Acceptance Testing. Devices, equipment, components, and sequences shall be individually tested in accordance with appropriate standards and manufacturers' documented instructions.

7.11 Photovoltaic Systems

7.11.1 Photovoltaic systems shall be in accordance with Section 7.11 and NFPA 70 or any approved code/standard.

7.11.2 Building-Mounted Photovoltaic Installations.

7.11.2.1 Marking. Photovoltaic systems shall be permanently marked as specified in this subsection.

7.11.2.1.1 Main Service Disconnect Marking. A label shall be permanently affixed to the main service disconnect panel serving alternating current (AC) and direct current (DC) photovoltaic systems. The label shall be red with white capital letters at least 3⁄4 in. (19 mm) in height and in a non-serif font, to read: "WARNING: PHOTOVOLTAIC POWER SOURCE." The materials used for the label shall be reflective, weather resistant, and suitable for the environment.

7.11.2.1.2 Circuit Disconnecting Means Marking. A permanent label shall be affixed adjacent to the circuit breaker controlling the inverter or other photovoltaic system electrical controller serving ac and dc photovoltaic systems. The label shall have contrasting color with capital letters at least 3⁄8 in. (10 mm) in height and in a non-serif font, to read: "PHOTOVOLTAIC DISCONNECT." The label shall be constructed of durable adhesive material or other approved material.

7.11.2.1.3 Conduit, Raceway, Enclosure, Cable Assembly, and Junction Box Markings. Marking shall be required on all interior and exterior DC conduits, raceways, enclosures, cable assemblies, and junction boxes.

7.11.2.1.3.1 Marking Locations. Marking shall be placed on all DC conduits, raceways, enclosures, and cable assemblies every 10 ft (3048 mm), at turns, and above and below penetrations. Marking shall be placed on all DC combiner and junction boxes.

7.11.2.1.3.2 Marking Content and Format. Marking for DC conduits, raceways, enclosures, cable assemblies, and junction boxes shall be red with white lettering with minimum 3⁄8 in. (10 mm) capital letters in a non-serif font, to read: "WARNING: PHOTOVOLTAIC POWER SOURCE." Marking shall be reflective, weather resistant, and suitable for the environment.

7.11.2.1.4 Secondary Power Source Markings. Where photovoltaic systems are interconnected to battery systems, generator backup systems, or other secondary power systems, additional signage acceptable to AHJ shall be required indicating the location of the secondary power source shut off switch.

7.11.2.1.5 Installer Information. Signage, acceptable to AHJ, shall be installed adjacent to the main disconnect indicating the name and emergency telephone number of the installing contractor.

7.11.2.1.6 Inverter Marking. Markings shall not be required for inverters.

71.11.2.2 Access, Pathways, and Smoke Ventilation

7.11.2.2.1 General. Access and spacing requirements shall be required to provide emergency access to the roof, provide pathways to specific areas of the roof, provide for smoke ventilation opportunity areas, and to provide emergency egress from the roof.

7.11.2.2.1.1 Roof Access Points. Roof access points shall be defined as areas where fire department ladders are not placed over openings (windows or doors), are located at strong points of building construction, and are in locations where they will not conflict with overhead obstructions (tree limbs, wires, or signs).

7.11.2.2.2 Buildings Other Than One- and Two-Family Dwellings and Townhouses. Photovoltaic energy systems installed in any building other than one- and two-family dwellings and townhouses shall be in accordance with this section.

7.11.2.2.2.1 Access. A minimum 4 ft (1219 mm) wide clear perimeter shall be provided around the edges of the roof for buildings with a length or width of 250 ft (76.2 m) or less along either axis. A minimum 6 ft (1829 mm) wide clear perimeter shall be provided around the edges of the roof for buildings having length or width greater than 250 ft (76.2 m) along either axis.

7.11.2.2.2.2 Pathways. Pathways shall be established as follows:

(1) Pathways shall be over areas capable of supporting the live load of fire fighters accessing the roof.

(2) Centerline axis pathways shall be provided in both axes of the roof.

(3) Centerline axis pathways shall run where the roof structure is capable of supporting the live load of fire fighters accessing the roof.

(4) Pathways shall be in a straight line not less than 4 ft (1219 mm) clear to skylights, ventilation hatches, and roof standpipes.

(5) Pathways shall provide not less than 4 ft (1219 mm) clear around roof access hatches with at least one not less than 4 ft (1219 mm) clear pathway to the parapet or roof edge.

7.11.2.2.2.3 Smoke Ventilation. Ability for fire department smoke ventilation shall be provided in accordance with this section.

7.11.2.2.2.3.1 Maximum Array. Arrays of photovoltaic modules shall be no greater than 150 ft (45.7 m) × 150 ft (45.7 m) in distance in either axis.

7.11.2.2.2.3.2 Ventilation Options. Ventilation options between array sections shall be one of the following:

(1) A pathway 8 ft (2438 mm) or greater in width

(2) A pathway 4 ft (1219 mm) or greater in width and bordering on existing roof skylights or ventilation hatches

(3) A pathway 4 ft (1219 mm) or greater in width and bordering 4 ft (1219 mm) × 8 ft (2438 mm) venting cutouts options every 20 ft (6096 mm) on alternating sides of the pathway.

7.11.2.2.3 Location of Direct Current (DC) Conductors

7.11.2.2.3.1 Exterior-mounted DC conduits, wiring systems, and raceways for photovoltaic circuits shall be located as close as possible to the ridge, hip, or valley and from the hip or valley as directly as possible to an outside wall to reduce trip hazards and maximize ventilation opportunities.

7.11.2.2.3.2 Conduit runs between sub arrays and to DC combiner boxes shall be designed to take the shortest path from the array to the DC combiner box.

7.11.2.2.3.3 DC combiner boxes shall be located so that conduit runs are minimized in the pathways between arrays.

7.11.2.2.3.4 DC wiring shall be run in metallic conduit or raceways where located within enclosed spaces in a building.

7.11.2.2.3.4.1 Where DC wiring is run perpendicular or parallel to load-bearing members, a minimum 10 in. (254 mm) space below roof decking or sheathing shall be maintained.

7.11.3 Ground-Mounted Photovoltaic System Installations. Ground-mounted photovoltaic systems shall be installed in accordance with Sections 7.11.3.1 through 7.11.3.3.

7.11.3.1 Clearances. A clear area of 10 ft (3048 mm) around ground-mounted photovoltaic installations shall be provided.

7.11.3.2 Noncombustible Base. A gravel base or other noncombustible base acceptable to AHJ shall be installed and maintained under and around the installation.

7.11.3.3 Security Barriers. Fencing, skirting, or other suitable security barriers shall be installed when required by AHJ.

Chapter 8 Fire Safety Construction Features

8.1 General

8.1.1 This chapter shall apply to new, existing, permanent, or temporary buildings.

8.1.2 Existing buildings shall be evaluated for fire safety in accordance with the provisions of this chapter. Where practical difficulty exists in implementing the provisions of this chapter in existing buildings, additional fire safety measures for life safety, over and above the minimum specified elsewhere in these Provisions for various occupancies, shall be provided.

8.2 Construction

8.2.1 Where required by these Provisions, a type of building construction shall comply with NFPA 220 or any approved code/standard.

8.2.2 Fire Safety Construction Features for new and existing occupancies shall comply with this code.

8.2.3 Type of Construction

8.2.3.1 Buildings and structures shall be classified according to their type of construction, which shall be based upon one of five basic types of construction designated as Type I, Type II, Type III, Type IV, and Type V, with fire resistance ratings not less than those specified in Table 8.2.3.1. Type of construction shall comply with Chapter 4 of NFPA 220 or any approved code/standard.

8.2.3.2 Type I and Type II construction shall be those types in which the fire walls, structural elements, walls, arches, floors, and roofs are of approved noncombustible or limited-combustible materials.

8.2.3.3 Type III construction shall be that type in which exterior walls and structural members that are portions of exterior walls are of approved noncombustible or limited-combustible materials, and in which fire walls, interior structural elements, walls, arches, floors, and roofs, are entirely or partially of wood of smaller dimensions than required for Type IV construction or are of approved noncombustible, limited-combustible, or other approved combustible materials.

8.2.3.4 Type IV construction shall be that type in which fire walls, exterior walls, and interior bearing walls and structural element that are portions of such walls are of approved noncombustible or limited-combustible materials. Other interior structural elements, arches, floors, and roofs shall be of solid or laminated wood without concealed spaces

8.2.3.5 Type V construction shall be that type in which structural elements, walls, arches, floors, and roofs are entirely or partially of wood or other approved material.

8.2.4 Exterior Walls

8.2.4.1 Exterior walls shall have a fire resistance rating based on Table 8.2.3.1 and Table 8.2.4.1, whichever is greater.

8.2.4.2 The fire resistance rating requirements of 8.2.4.1 shall not apply to exterior walls of existing buildings and new one- and two-family dwellings.

8.2.4.3 Horizontal separation shall be measured at a 90-degree angle to the exterior wall.

8.2.4.4 Where two or more buildings are located on the same lot, the horizontal separation shall be measured from the exterior wall to an imaginary line drawn between the exterior walls of the adjacent buildings.

8.2.4.5 The imaginary line shall be placed at a distance from the facing exterior wall of the adjacent building that is equal to the horizontal separation applicable for that wall based on its fire resistance rating and protection of openings.

Table 8.2.3.1 Fire Resistance Rating (in hours) for Type 1 Through Type V Construction

Construction Element	Type I	Type II	Type III	Type IV	Type V
Exterior Bearing Walls					
Supporting more than one floor, columns, or other bearing walls	4	2	2	2	1
Supporting one floor only	4	2	2	2	1
Supporting a roof only	4	1	2	2	1
Interior Bearing Walls					
Supporting more than one floor, columns, or other bearing walls	4	2	1	2	1
Supporting one floor only	3	2	1	1	1
Supporting roofs only	3	1	1	1	1
Columns					
Supporting more than one floor, columns, or other bearing walls	4	2	1	H	1
Supporting one floor only	3	2	1	H	1
Supporting roofs only	3	1	1	H	1
Beams, Girders, Trusses, and Archers	4	2	1	H	1
Supporting more than one floor, columns, or other bearing walls	2	2	1	H	1
Supporting one floor only	2	1	1	H	1
Supporting roofs only					
Floor / Ceiling Assemblies	2	2	1	H	1
Roof / Ceiling Assemblies	2	1	1	H	1
Interior Nonbearing Walls	0	0	0	0	0
Exterior Nonbearing Walls					

H: Heavy timber members

Table 8.2.4.1 Fire Resistance Rating Requirement for Exterior Walls

OCCUPANCY	Horizontal separation (m)			
	0 to 1.5	More than 1.5 to 3	More than 3 to 9	More than 9
Assembly, educational, day care, health care, ambulatory health care, detention and correctional, residential, residential board and care, business, industrial, and low hazard storage	1	1	0	0
Mercantile and industrial and storage occupancies with ordinary hazards	2	1	0	0
Industrial and storage occupancies with high hazards	3	2	1	0

8.2.4.6 Where the exterior wall is an irregular vertical shape, the following criteria shall be met:

(1) The horizontal separation shall be determined by measuring from a vertical plane that is located so that no portion of the exterior wall is between such vertical plane and the line to which the horizontal separation is measured.

(2) The area of openings shall be determined from the projection of the openings in the exterior wall onto the vertical plane.

8.2.4.7 Openings in Exterior Walls

8.2.4.7.1 Where an exterior wall is required to have a fire resistance rating as determined by Section 8.2.4.1, the area of unprotected openings in exterior walls shall not exceed that permitted by Section 8.3 and Table 8.2.4.7.1(a) or Table 8.2.4.7.1(b).

8.2.4.7.2 The area of unprotected openings in an exterior wall shall be the aggregate of unprotected openings expressed as a percentage of the area of the exterior wall.

8.2.4.7.3 The area of an exterior wall shall be calculated as the length, edge to edge, of the exterior wall multiplied by the measurement from the finished ground level to the uppermost ceiling.

8.2.4.7.4 The area of unprotected openings permitted by Table 8.2.4.7.1(a) or Table 8.2.4.7.1(b) shall be permitted to be doubled under either of the following conditions.

(1) Where the building is protected throughout with an approved automatic sprinkler system.

(2) Where the openings are protected with a fire window, fire door, fire shutters assembly or other approved opening protective having the required fire protection rating in accordance with Table 8.2.4.7.4.

Table 8.2.4.7.1(a) Maximum Allowable Area of Unprotected Openings (percentage of exterior walls) for Assembly, Educational, Day-Care, Health Care, Detention and Correctional, Residential, Residential Board and Care, Business, Industrial, and Storage Occupancies with Low Hazard Contents, unless this is in contradiction to any other approved code/building provisions

Horizontal Separation (ft)	Maximum Area of Exposing Building Face (ft^2)																		
	100	150	200	250	300	400	500	600	700	800	900	1000	1500	2000	2500	3500	5000	10,000	≥90,000
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	9	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7	7	7
5	12	11	10	9	9	9	8	8	8	8	8	8	7	7	7	7	7	7	7
6	18	15	13	12	11	10	10	9	9	9	9	8	8	8	8	7	7	7	7
7	25	20	17	15	14	12	11	11	10	10	10	9	9	9	9	9	9	7	7
8	33	25	21	19	17	15	14	13	12	11	11	11	10	9	9	8	8	7	7
9	43	32	27	23	21	18	16	15	14	13	12	12	11	10	9	9	8	8	7
10	55	40	33	28	25	21	19	17	16	15	14	13	12	11	10	9	9	8	7
>10	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

For SI units, 1 ft = 0.3048 m; 1 ft^2 = 0.093 m^2

Table 8.2.4.7.1(b) Maximum Allowable Area of Unprotected Openings (percentage of exterior wall) - for Mercantile and Industrial and Storage Occupancies with Ordinary Hazard Contents, and Industrial and Storage Occupancies with High Hazard Contents, unless this is in contradiction to any other approved code/building provisions

Horizontal Separation (ft)	Maximum Area of Exposing Building Face (ft^2)																		
	100	150	200	250	300	400	500	600	700	800	900	1000	1500	2000	2500	3500	5000	10,000	≥90,000
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	6	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4
6	9	7	7	6	6	5	5	5	5	4	4	4	4	4	4	4	4	4	4
7	12	10	8	8	7	6	6	5	5	5	5	5	4	4	4	4	4	4	4
8	17	13	11	9	9	7	7	6	6	6	5	5	5	4	4	4	4	4	4
9	21	16	13	12	10	9	8	7	7	7	6	6	5	5	5	4	4	4	4
10	27	20	16	14	12	11	9	8	8	7	7	7	6	5	5	5	4	4	4
15	69	48	38	31	27	21	18	16	14	13	12	12	9	8	7	6	6	5	4
20	100	91	70	57	48	38	31	27	24	22	20	18	16	12	10	9	7	6	5
25	100	100	100	91	77	59	48	41	36	32	29	27	20	16	14	11	9	7	5
30	100	100	100	100	100	86	59	56	52	46	42	38	27	22	18	15	12	8	6
>30	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

For SI units, 1 ft = 0.3048 m; 1 ft^2 = 0.093 m^2.

Table 8.2.4.7.4 Minimum Fire Protection Ratings for Exterior Opening Protectives

Wall Fire Resistance Rating (hr)	Fire Protection Rating (hr)
2	1 ½
1	¾

8.2.5 Height and Area Requirements

8.2.5.1 The heights and areas of buildings based on their type of construction classification, shall not exceed the allowable heights set forth in Table 8.2.5.1.

8.2.6 Separated Occupancies

8.2.6.1 Where separated occupancies are provided in a building, each part of the building comprising a distinct occupancy, shall be completely separated from other occupancies by fire-resistive assemblies having fire resistance rating not less than 2 h.

8.2.6.2 Two hours fire resistance ratings required in 8.2.6.1 shall be permitted to be reduced to 1 hour, where the building is protected with automatic sprinkler system.

8.2.6.3 Occupancy separations shall be vertical, horizontal, or both or, any other form as required to provide complete separation amongst different occupancies in the building.

Table 8.2.5.1 Allowable Building Height and Area

Communication Type	TYPE I				TYPE II						TYPE III				TYPE IV		TYPE V			
	442		332		222		111		000		211		200		2HH		111		000	
	S	N	S	N	S	N	S	N	S	N	S	N	S	N	S	N	S	N	S	N
Maximum building height (ft)	UL	UL	420	400	180	160	85	65	75	55	85	65	75	55	85	65	700	50	60	40
OCCUPANCY																				
Assembly>1000	UL	4	UL	4	12	4	3	2	1	NP	3	2	NP	NP	3	2	3	2	NP	NP
ASSEMBLY>300	UL UL UL	UL 4 UL	UL UL UL	15500 4 15500	8500 12 8500	14000 4 14000	NP 4 8500	15000 3 15000	11500 2 11500	NP 1 5500	4	2	1	1	4	2	4	2	1	1
ASSEMBLY≤300	UL UL	7 UL	UL UL	7 15500	12 8500	7 14000	4 8500	3 15000	2 11500	1 5500	4	3	2	1	4	3	4	3	2	1
Assembly, Outdoor	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL	4	3	3	2	4	3	3	2	2	1
Business	UL UL	UL UL	UL UL	UL 37500	12 23000	11 28500	6 19000	5 36000	5 18000	4 9000	6	5	5	4	6	5	4	3	3	2
Board and care, large	UL UL	UL UL	UL 55000	UL 19000	12 10000	NP 16500	3 10000	NP 18000	2 10500	NP 4500	2	NP	1	NP	2	NP	2	NP	1	NP
Board and care, small	UL UL	UL UL	UL UL	UL 24000	12 16000	11 24000	5 16000	4 20500	5 12000	4 7000	5	4	5	4	5	4	4	3	3	2
Day care	UL UL	2 UL	UL 60500	2 26500	12 13000	2 23500	6 13000	1 25500	4 18500	1 9000	4	1	2	1	2	1	4	1	2	1
Detention and correctional	UL UL	7 UL	UL UL	7 15000	12 10000	7 10500	2 7500	2 12000	2 7500	NP 5000	2	2	2	NP	2	2	2	2	2	NP
Educational	UL UL	UL UL	UL UL	UL 26500	12 14500	5 23500	4 14500	3 25500	3 18500	2 9500	4	3	3	2	4	3	2	1	2	1
Health care	UL UL	NP UL	UL UL	NP 15000	12 11000	NP 12000	3 NP	NP 12000	1 9500	NP NP	1	NP	NP	NP	1	NP	1	NP	NP	NP
Health care, ambulatory	UL UL	UL UL	UL UL	UL 37500	12 23000	11 28500	6 19000	5 36000	5 18000	1 9000	6	5	5	1	6	5	4	3	3	1
Industrial, ordinary hazard	UL UL	UL UL	UL UL	UL 25000	12 15500	11 19000	5 12000	4 33500	3 14000	2 8500	4	3	3	2	5	4	3	2	2	1
Industrial, low hazard	UL UL	UL UL	UL UL	UL 37500	12 23000	11 28500	6 18000	5 50500	4 21000	3 13000	5	4	4	3	6	5	4	3	3	2
Mercantile	UL UL	UL UL	UL UL	UL 21500	12 12500	11 18500	5 12500	4 20500	5 14000	4 9000	5	4	5	4	5	4	4	3	2	1
Residential	UL UL	UL UL	UL UL	UL 24000	12 16000	11 24000	5 16000	4 20500	5 12000	4 7000	5	4	5	4	5	4	4	3	3	2
Residential, 1-and 2-family	UL UL	UL UL	UL UL	UL UL	12 UL	11 UL	5 UL	4 UL	5 UL	4 UL	5	4	5	4	5	4	4	4	3	2
Storage, ordinary hazard	UL UL	UL UL	UL 48000	UL 26000	12 17500	11 26000	5 17500	4 25500	4 14000	3 9000	4	3	4	3	5	4	4	3	2	1
Storage, low hazard	UL UL	UL UL	UL 79000	UL 39000	12 26000	11 39000	6 26000	5 38500	5 21000	4 13500	5	4	5	4	6	5	5	4	3	2
HIGH HAZARD CONTENTS																				
High hazard contents not requiring Protection Level 1 through Protection Level 5	Use values for appropriate occupancy class. For industrial or storage occupancies, use values for ordinary hazard.																			
Protection Level 1	1 21000	NP 21000	1 16500	NP 11000	1 7000	NP 9500	1 7000	NP 10500	1 7500	NP NP	1	NP	1	NP	1	NP	1	NP	NP	NP
Protection Level 2	UL 21000	NP 21000	UL 16500	NP 11000	3 7000	NP 9500	2 7000	NP 10500	1 7500	NP 3000	2	NP	1	NP	2	NP	1	NP	1	NP

Table 8.2.5.1 Continued

Communication Type	TYPE I				TYPE II						TYPE III				TYPE IV	
	442		332		222		111		000		211		200		2HH	
	S	N	S	N	S	N	S	N	S	N	S	N	S	N	S	N
Maximum building height (ft)	UL	UL	420	400	180	160	85	65	75	55	85	65	75	55	85	65
Protection level 3	UL UL	NP UL	UL 60000	NP 26500	6 14000	NP 17500	4 13000	NP 25500	2 10000	NP 5000	4	NP	2	NP	4	NP
Protection level 4	UL UL	NP UL	UL UL	NP 37500	8 17500	NP 28500	6 17500	NP 36000	4 18000	NP 6500	6	NP	4	NP	6	NP
Protection level 5	4 UL	NP UL	4 UL	NP 37500	4 23000	NP 28500	3 19000	NP 36000	3 18000	NP 9000	3	NP	3	NP	3	NP

8.2.7 Fire Resistance Rating Requirement for Structural Elements

8.2.7.1 The fire resistance ratings of structural elements and building assemblies shall be determined in accordance with the prescriptive requirements in Section 8.2 in NFPA 5000, or in accordance with Section 8.2.3 in NFPA 101 or any other approved code/standard or other approved test or analytical methods.

8.2.7.2 Structural elements, floors, and bearing walls shall have a fire resistance rating not less than the fire resistance rating required for the structural element, bearing or non-bearing wall, floor, or roof they support.

8.2.7.3 Structural elements, such as girders, beams, trusses, and spandrels, that have direct connections to columns carrying gravity loads, and that are essential to the stability of the building as a whole, shall have a fire resistance rating not less than that of the columns to which they are connected.

8.2.7.4 Structural elements required having a fire resistance rating and that support more than two floors, one floor and roof, a bearing wall, or a non-bearing wall more than two stories high shall be individually protected on all sides for their full length with materials providing the required fire resistance rating.

8.2.7.5 Fire-resistive materials covering columns required to have a fire resistance rating, where exposed to impact damage by moving vehicles, handling of merchandise, or by other means, shall be protected from damage.

8.2.7 Fire Separation and Protection of Various Rooms. Fire protection rating requirement for various rooms and separation shall be as specified in Table 8.2.7.

8.2.7.1 Emergency Command Centre. The Emergency Command Centre shall be separated from other parts of the same building by compartment walls and floors having fire resistance of at least 1 hour with fire suppression system.

8.2.7.2 Fire Pump Room. Fire pump room shall have 2 hours fire rated compartment in non-sprinklered buildings.

8.2.7.3 T**heatres, Cinemas or Concert Halls**

8.2.7.3.1 A theatre, cinema or concert hall shall be separated from other parts of the same building, which is of a different purpose group, by compartment walls and floors having a fire resistance of at least 2-hour. If the building is protected by an automatic sprinkler system, the fire resistance rating of the compartment walls or floors can be reduced to 1-hour.

Table 8.2.7 Fire separation and protection for various rooms (Source: UAE Fire and Life Safety Code of Practice)

Usage	With Sprinkler Protection or Other Suppression System	Without Sprinkler Protection or Other Suppression System
A/C Plant room	As per Building construction type	As per Building construction type
AHU room	As per Building construction type	As per Building construction type
Boiler Room (oil fired)	1 hr rating	2 hr rating
Central Bulk Laundries >9.3m^2	1 hr rating	2 hr rating
Cold room >20m^2	1 hr rating	2 hr rating
Cold room $\leq$20m^2	0(No storage of flammable material)	1(No storage of flammable material)
Communication Nerve Centre	As per Building construction type	As per Building construction type
Control room	As per Building construction type	As per Building construction type
Date Centre	As per Building construction type	As per Building construction type
Electric Lift motor room	As per Building construction type	As per Building construction type
Electrical room	As per Building construction type	As per Building construction type
Emergency Command Centre	1 hr rating	2 hr rating
Emergency lighting battery room	1 hr rating	2 hr rating
Essential fan room	As per Building construction type	As per Building construction type
Fire pump room	1 hr rating	2 hr rating
Generator room	1 hr rating	2 hr rating
Gift or retail shops	0 hr rating	1 hr rating
Guest Laundry room <9.3m^2	0 hr rating	1 hr rating
Guest Laundry room >9.3m^2	1 hr rating	2 hr rating
High voltage switch room	As per Building construction type	As per Building construction type
Hydraulic lift motor room	As per Building construction type	As per Building construction type
Kitchen	1 hr rating (if no kitchen suppression is provided)	1 hr rating limited to 150 m^2
Laboratories using flammable or combustible liquid Usage	1 hr rating	2 hr rating
	With Sprinkler Protection or other suppression system	With Sprinkler Protection or other suppression system
Locker rooms	0 hr rating	1 hr rating
Low voltage switch room	As per Building construction type	As per Building construction type
Maintenance workshop	1 hr rating	2 hr rating
MDF Room	As per Building construction type	As per Building construction type
Oil Tank room	1 hr rating	2 hr rating
PABX room	As per Building construction type	As per Building construction type
Padded cells	1 hr rating	2 hr rating
Paint shops	1 hr rating	2 hr rating
Soiled linen rooms	1 hr rating	2 hr rating
Spray painting room	1 (with vapor extract)	2 (with vapor extract)
Sprinkler/Wet riser tank room	As per Building construction type	As per Building construction type
Storage rooms<9.3m^2	0 hr rating	1 hr rating
Storage rooms>9.3m^2	1 hr rating	2 hr rating
Transformer room (oil type)	1 hr rating	2 hr rating
Trash collection room	1 hr rating	2 hr rating

8.2.7.3.2 Where openings are provided for access between the theatre, cinema or concert hall and any other part of the same building of a different purpose group, the openings shall either be protected by fire doors having the necessary fire resistance rating as the enclosing walls or floors, or be provided with lobby which complies with Sections 8.2.7.3.2.1 and 8.2.7.3.2.2.

8.2.7.3.2.1 The lobby is enclosed by walls having fire resistance of at least one hour, is naturally or mechanically ventilated.

8.2.7.3.2.2 All doors to the lobby shall each have fire resistance of not less than half an hour and fitted with automatic self-closing device.

8.2.7.4 Hotel Bedrooms. Each hotel bedroom shall be compartmented from adjoining rooms and other parts of the same building by construction having fire resistance rating of at least 1 hour.

8.2.7.5 Motor Vehicle Workshop. A motor vehicle workshop shall be separated from any other part of the same building by compartment walls and floors having fire resistance of not less than 2 hours.

8.2.7.6 Spray Painting Room

8.2.7.6.1 Areas in which spray painting or other allied processes are performed or carried out, shall be separated from other parts of the same building by compartment walls and floors having fire resistance of not less than 2 hours. Spray painting booths shall have built in vapor extraction system.

8.2.7.6.2 Where a spray painting room or booth is protected by an automatic fire suppression system, the fire compartment to the room or booth can be reduced from 2 hours to 1 hour.

8.2.7.7 Cold Rooms

8.2.7.7.1 Where a cold room has a floor area exceeding 20 m², a separate outer layer of non-combustible construction, including the door, having minimum 1-hour fire resistance rating (with sprinkler), shall be provided to compartmentalize the cold room enclosure from other areas. **8.2.7.7.2** Provision of the fire resisting outer layer enclosure, including the fire door to the cold room would not be required if the cold room has a floor area not exceeding 20 m² and is sprinkler protected. The storage materials shall not include highly flammable chemicals.

8.2.7.7.3 Cold room lesser than 20 m² provided with at least one hour fire rating compartment, need not be provided with sprinklers provided that the storage shall not include flammable materials.

8.2.8 Underground Buildings. All structural members up to and including the floor of the lowest level of discharge of underground buildings more than 7 m below or more than two level below the lowest level of exit discharge shall be at least 2 hours fire rated construction. No part of a basement storey shall be used for the bulk storage of highly inflammable liquids or substances of an explosive nature.

8.2.9 Skylights. Wired glass for skylights or monitor lights shall comply with the following requirements:

(1) Wired glass for skylights or monitor lights: The wired glass for skylights or monitor lights shall be of minimum half hour fire resistance rating.

(2) Frames and glazing: The frame shall be continuous and divided by bars spaced at not more than 700 mm (2.33 ft) centres. The frame and bars shall be of iron or other hard metal, and supported on a curb either of metal or of wood covered with sheet metal. The toughened glass shall be secured by hard metal fastenings to the frame and bars independently of any lead, cement or putty used for weather-proofing purposes.

8.2.10 Louvers. Louvers shall be of minimum half hour fire resistance rating.

8.3 Fire Doors, Fire Windows and Other Opening Protective

8.3.1 The installation and maintenance of fire door assemblies and fire window assemblies used to protect openings in walls, floors, and ceilings against the spread of fire and smoke within, into, or out of buildings shall comply with Section 8.4 and NFPA 80 or any other approved code/standard.

8.3.2 Unless otherwise specified, fire doors shall be self-closing or automatic-closing.

8.3.3 Fire door assemblies shall achieve a fire resistance rating not less than the assembly being penetrated.

8.3.4 Operability and Maintenance

8.3.4.1 Doors, shutters, and windows shall be operable at all times.

8.3.4.2 Doors, shutters, and windows shall be kept closed and latched or arranged for automatic closing.

8.3.4.3 Fire door assemblies shall be visually inspected from both sides to assess the overall condition of door assembly, its operability and that all parts are securely and properly fixed. The self-closing device is operational; that is, the active door completely closes when operated from the full open position.

8.3.5 Inspection and Testing

8.3.5.1 Upon completion of the installation, door, shutters, and window assemblies shall be inspected and tested in accordance with Section 5.2.4 of NFPA 80 or any other approved code/standard.

8.3.5.2 A record of all inspections and testing shall be signed by the inspector and kept for inspection by AHJ.

8.3.5.3 Records of acceptance tests shall be retained for the life of the assembly.

8.3.5.4 A record of all inspections and testing shall be provided that includes, but is not limited to, the following information:

(1) Date of inspection

(2) Name of facility

(3) Address of facility

(4) Name of person(s) performing inspections and testing

(5) Company name and address of inspecting company

(6) Signature of inspector of record

(7) Individual record of each inspected and tested fire door assembly

(8) Opening identifier and location of each inspected and tested fire door assembly

(9) Type and description of each inspected and tested fire door assembly

(10)Verification of visual inspection and functional operation

(11) Listing of deficiencies

8.3.5.5 Periodic inspections and testing shall be performed not less than annually.

8.4 Interior Finish

8.4.1 Interior finish in buildings and structures shall meet the requirements of Section 8.4 and referenced sections of NFPA 101 or any other approved code/standard.

8.4.2 General

8.4.2.1 Existing wall and ceiling finishes shall be exempt from the flame spread index and smoke developed index criteria of Section 8.5.4, except if used in exits.

8.4.2.2 Existing floor finishes shall be exempt from the flame spread index and smoke developed index criteria of 8.5.4, except if used in exits.

8.4.2.3 Materials applied, in total thickness of less than 1/28 in. (0.90 mm), directly to the surface of walls and ceilings shall not be considered interior finish.

8.4.2.4 Existing installations of materials applied directly to the surface of walls and ceilings in a total thickness of less than 1⁄28 in. (0.9 mm) shall be permitted to remain in use.

8.4.2.5 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 interior finish and shall not be considered decorations or furnishings.

8.4.2.6 Lockers or Cupboard, Closet and Cabinet

8.4.2.6.1 Wood Lockers. Lockers constructed entirely of wood and of noncombustible materials shall be permitted to be used in any location.

8.4.2.6.2 Where lockers constructed of combustible materials other than wood are used, the lockers shall be considered interior finish.

8.4.2.7 Bulletin Boards, Posters, and Paper

8.4.2.7.1 Bulletin boards, posters, and paper attached directly to the wall shall not exceed 20 percent of the aggregate wall area to which they are applied.

8.4.2.7.2 The provision of 8.4.2.7.1 shall not apply to artwork and teaching materials in sprinklered educational or day-care occupancies.

8.4.3 Use of Interior Finishes

8.4.3.1 Requirements for interior wall and ceiling finish shall apply as specified in Table 8.

4.3.1.

Table 8.4.3.1 Interior Wall and Ceiling Finish, and Floor Finish Requirement

Occupancy	Exits	Exit Access Corridors	Other Spaces
Assembly > 300 Occupant Load	A 1 or 2	A or B 1 or 2	A or B
Assembly ≤ 300 Occupant Load	A 1 or 2	A or B 1 or 2	A, B or C
Educational	A 1 or 2	A or B 1 or 2	A or B; C for low partitions
Day Care Centers	A 1 or 2	A 1 or 2	A or B
Day Care Homes	A or B 1 or 2	A or B	A, B or C
Health Care	A 1 or 2	A (B, on lower portion of corridor) 1 or 2	A (B, in small individual rooms)
Detention and Correctional	A or B 1 or 2	A or B 1 or 2	A, B or C
One-and-Two Family Dwelling, Lodging and Rooming House	A, B or C	A, B or C	A, B or C
Hotels and Dormitories	A 1 or 2	A or B 1 or 2	A, B or C
Apartment Buildings	A 1 or 2	A or B 1 or 2	A, B or C
Residential Board and Care	A 1 or 2	A 1 or 2	A or B
Mercantile	A or B	A or B	A or B

	1 or 2		
Business and Ambulatory Health Care	A or B 1 or 2	A or B	A, B or C
Industrial	A or B 1 or 2	A, B or C 1 or 2	A, B or C
Storage	A or B 1 or 2	A, B or C	A, B or C

8.4.4 Interior Wall or Ceiling Finish Testing and Classification.

8.4.4.1 Interior wall or ceiling finish that is required elsewhere in these Provisions to be Class A, Class B, or Class C shall be classified based on test results from ASTM E 84, or ANSI/UL723, or any other approved code/standard.

8.4.4.2 AHJ is permitted to accept the classification of any interior finish material on which classification by a standard test is not available.

8.4.4.3 Products required to be tested in accordance with 8.4.4.1 shall be grouped in the classes described in 8.4.4.3.1 through 8.4.4.3.3 in accordance with their flame spread index and smoke development index.

8.4.4.3.1 Class A Interior Wall and Ceiling Finish. Class A interior wall and ceiling finishes shall be those finishes with a flame spread index of 0-25 and a smoke developed index of 0-450.

8.4.4.3.2 Class B Interior Wall and Ceiling Finish. Class B interior wall and ceiling finishes shall be those finishes with a flame spread index of 26-75 and a smoke developed index of 0-450.

8.4.4.3.3 Class C Interior Wall and Ceiling Finish. Class C interior wall and ceiling finishes shall be those finishes with a flame of 76–200 and a smoke developed index of 0–450.

8.4.4.4 The classification of interior finish specified in 8.4.4.3 shall be that of the basic material used by itself or in combination with other materials.

8.4.5 Specific Materials

8.4.5.1 Textile Wall and Textile Ceiling Materials. The use of textile materials on walls or ceilings shall meet the requirements of Class A Interior Wall and Ceiling Finish.

8.4.5.2 Expanded Vinyl Wall and Expanded Vinyl Ceiling Materials. The use of expanded vinyl wall or expanded vinyl ceiling materials shall meet the requirements of Class A Interior Wall and Ceiling Finish.

8.4.5.3 Light-Transmitting Plastics and Cellular or Foamed Plastic. Light-transmitting plastics, Cellular or Foamed Plastic shall be permitted to be used as interior wall and ceiling finish if approved by AHJ.

8.4.5.4 Metal Ceiling and Wall Panels. Finished metal ceiling and wall panels meeting the requirements of Class A shall be permitted to be finished with one additional application of paint. Such painted panels shall be permitted for use in areas where Class A interior finishes are required.

8.4.5.5 Reflective Insulation Materials. Reflective insulation materials shall be tested in the manner intended for use and shall comply with the requirements of any approved standard/code.

8.4.5.6 Cellular or foamed plastics shall be permitted to be used as interior wall and ceiling finish if approved by AHJ

8.4.6 Fire-Retardant Coatings

8.4.6.1 The required flame spread or smoke development classification of existing surfaces of walls, partitions, columns, and ceilings shall be permitted to be secured by applying approved fire-retardant coatings to surfaces having higher flame spread ratings than permitted.

8.4.6.2 Surfaces of walls, partitions, columns, and ceilings shall be finished with factory-applied fire retardant coated products.

8.4.6.3 Fire-retardant coatings or factory-applied fire retardant coated assemblies shall possess the desired degree of permanency and shall be maintained so as to retain the effectiveness of the treatment under the service conditions encountered in actual use.

8.4.7 Interior Floor Finish Testing and Classification

8.4.7.1 Carpet and carpet-like interior floor finishes shall comply with ASTM D 2859 or any other approved code/standard

8.4.7.2 Floor coverings, other than carpet, shall have a minimum critical radiant flux of 0.1 W/cm^2.

8.4.7.3 Interior floor finishes shall be classified in accordance with Section 8.5.7.4, based on test results from NFPA 253 or ASTM E 648 or any other approved code/standard.

8.4.7.4 Interior floor finishes shall be grouped in the classes specified in Sections 8.4.7.4.1 and 8.4.7.4.2 in accordance with the critical radiant flux requirements.

8.4.7.4.1 Class I Interior Floor Finish. Class I interior floor finish shall have a critical radiant flux of not less than 0.45 W/cm^2.

8.4.7.4.2 Class II Interior Floor Finish. Class II interior floor finish shall have a critical radiant flux of not less than 0.22 W/cm^2, but less than 0.45 W/cm^2.

8.4.8 Automatic Sprinklers

8.4.8.1 Where an approved automatic sprinkler system is installed in accordance with Section 9.3, Class C interior wall and ceiling finish materials shall be permitted in any location where Class B is required, and Class B interior wall and ceiling finish materials shall be permitted in any location where Class A is required.

8.4.8.2 Where an approved automatic sprinkler system is installed in accordance with Section 9.3, throughout the fire compartment or smoke compartment containing the interior floor finish, Class II interior floor finish shall be permitted in any location where Class I interior floor finish is required, and where Class II is required, the provisions of 8.4.7.2 shall apply.

8.5 Contents and Furnishings

8.5.1 Mattresses, upholstered furniture, draperies, curtains, and other similar loosely hanging furnishings and decorations of an explosive or highly flammable character shall not be used.

8.6 Fire Barriers

8.6.1 General

8.6.1.1 Construction assemblies required to be fire resistance–rated floors or roofs, or a combination of floors or roofs and ceilings, fire doors, fire windows, shall be fire barriers having a fire resistance rating set forth in Table 8.2.3.1, 8.2.4.1 and 8.2.7, which ever greater.

8.6.1.2 Fire protection-rated glazing shall be permitted in fire barriers having a required fire resistance rating of 1 hour or less and shall be of an approved type.

8.6.2 Walls, Roofs and Floors

8.6.2.1 The design and construction of fire walls and fire barrier walls that are required to separate buildings or subdivide a building to prevent the spread of fire shall comply with NFPA 221 or any other approved code/standard.

8.6.2.2 Fire resistance–rated glazing, walls, roof, floor and walls tested in accordance with ASTM E 119 or ANSI/UL 263 or any other approved code/standard, shall be permitted.

8.6.3 Fire Doors and Windows

8.6.3.1 Openings required to have a fire protection rating by Table 8.6.3.1 shall be protected by approved fire door assemblies and fire window assemblies and their accompanying hardware, including all frames, closing devices, anchorage, and sills in accordance with the requirements of Section 8.3, except as otherwise specified in these Provisions.

8.6.3.2 Fire resistance–rated glazing specified in Section 8.6.2.2 shall be permitted in fire door assemblies and fire window assemblies.

8.6.3.3 Floor fire door assemblies shall be tested in accordance with NFPA 288 or any other approved code/standard, and shall achieve a fire resistance rating not less than the assembly being penetrated.

8.6.3.4 Glazing in fire window assemblies, other than in existing fire window installations of wired glass and other fire rated glazing material, shall be of a design that has been tested to meet the conditions of acceptance of NFPA 257 or ANSI/UL 9 or any other approved code/standard. Fire protection–rated glazing in fire door assemblies, other than in existing fire-rated door assemblies, shall be of a design that has been tested to meet the conditions of acceptance of NFPA252 ANSI/UL 10B or ANSI/UL 10C or any other approved code/standard.

8.6.4 Opening Protectives

8.6.4.1 Every opening in a fire barrier shall be protected to limit the spread of fire and restrict the movement of smoke from one side of the fire barrier to the other.

8.6.4.2 The fire protection rating for opening protective in fire barriers, fire-rated smoke barriers, and fire-rated smoke partitions shall be in accordance with Table 8.6.3.1, except as otherwise permitted in Section 8.6.4.3.

Table 8.6.3.1 Minimum Fire Protection Ratings for Opening Protectives in Fire Resistance–Rated Assemblies (Source: UAE Fire and Life Safety Code of Practice)

	Fire Resistance Rating	**Fire Protection Rating**	
COMPONENT	Walls and Partitions (hrs)	Fire Door Assemblies (hrs)	Fire Window Assemblies
Elevator hoist ways	2	1 ½	Windows Not allowed
	1	1	
Vertical shafts, stairways, services refuse chutes.	2	1 ½	Windows Not allowed
	1	1	
HC (High Challenge) Fire walls and Fire Walls	4	2	Windows Not allowed
	3	3	
	2	1 ½	
Fire barrier	4	3	Windows Not allowed
	3	3	Windows Not allowed
	2	1 ½	Windows Not allowed
	1	1	¾

Horizontal exit	2	1 ½	Windows Not allowed
Exit Access Corridors	1	1	¾
Exit Passageways	2	1 ½	1 ½
Smoke barrier	1	1 ½	¾
Smoke partition	½	½	½

8.6.4.3 Existing fire door assemblies having a minimum 3⁄4-hour fire protection rating shall be permitted to continue to be used in vertical openings and in exit enclosures in lieu of the minimum 1-hour fire protection rating required by Table 8.6.3.1.

8.6.5 Penetrations. The provisions of Section 8.6.5 shall govern the materials and methods of construction used to protect through-penetrations and membrane penetrations in firewalls, fire barrier walls, and fire resistance-rated horizontal assemblies.

8.6.5.1 Firestop Systems and Devices Required. Penetrations for cables, cable trays, conduits, pipes, tubes, combustion vents and exhaust vents, wires, and similar items to accommodate electrical, mechanical, plumbing, and communications systems that pass through a wall, floor, or floor/ceiling assembly constructed as a fire barrier shall be protected by a firestop system or device. The firestop system or device shall be tested in accordance with ASTM E 814 or ANSI/UL 1479 or any other approved code/standard.

8.6.5.1.1 F Ratings. Firestop systems and devices shall have a minimum1-hour F rating, but not less than the required fire resistance rating of the fire barrier penetrated.

8.5.5.1.2 T Ratings. Penetrations in fire resistance–rated horizontal assemblies shall be required to have a T rating of at least 1 hour, but not less than the fire resistance rating of the horizontal assembly.

8.6.5.2 Sleeves. Where the penetrating item uses a sleeve to penetrate the wall or floor, the sleeve shall be securely set in the wall or floor, and the space between the item and the sleeve shall be filled with a material that complies with Section 8.6.5.1.

8.6.5.3 Insulation and Coverings. Insulation and coverings for penetrating items shall not pass through the wall or floor unless the insulation or covering has been tested as part of the firestop system or device.

8.6.5.4 Openings for Air-Handling Ductwork. Openings in fire barriers for air-handling ductwork or air movement shall be protected in accordance with Section 7.2.1.

8.6.6 Joints

8.6.6.1 The provisions of Section 8.6.6 shall govern the materials and methods of construction used to protect joints in between and at the perimeter of fire barriers or, where fire barriers meet other fire barriers, the floor or roof deck above, or the outside walls.

8.6.6.2 Joints made within or at the perimeter of fire barriers shall be protected with a joint system that is capable of limiting the transfer of smoke.

8.6.6.3 Joints made within or between fire barriers shall be protected with a smoke-tight joint system that is capable of limiting the transfer of smoke.

8.6.6.4 Joints made within or between fire resistance-rated assemblies shall be protected with a joint system that is designed and tested to prevent the spread of fire for a time period equal to that of the assembly in which the joint is located. Such materials, systems, or devices shall be tested as part of the assembly in accordance with the requirements of ASTM E 1966 or ANSI/UL 2079 or any other approved code/standard.

8.6.6.5 Exterior Curtain Walls and Perimeter Joints

8.6.6.5.1 Voids created between the fire resistance–rated floor assembly and the exterior curtain wall shall be protected with a perimeter joint system that is designed and tested in accordance with ASTM E 2307 or any other approved code/standard.

8.6.6.5.2 The perimeter joint system shall have an F rating equal to the fire resistance rating of the floor assembly.

8.6.7 Maintenance of Fire-Resistive Construction

8.6.7.1 Fire-resistive construction, including fire barriers, fire walls, exterior walls, and roof coverings, shall be regularly inspected and shall be properly repaired, restored, or replaced where damaged, altered, breached, penetrated, removed, or improperly installed.

8.6.7.2 Where required, fire-rated gypsum wallboard walls or ceilings that are damaged to the extent that through openings exist, the damaged gypsum wallboard shall be replaced or returned to the required level of fire resistance.

8.6.7.3 Where readily accessible, required fire-resistance rated assemblies in high-rise buildings shall be visually inspected for integrity at least once every 5 years.

8.7 Smoke Partitions

8.7.1 General. Where required elsewhere in these Provisions, smoke partitions shall be provided to limit the transfer of smoke.

8.7.2 Continuity. The following shall apply to smoke partitions:

(1) They shall extend from the floor to the underside of the floor or roof deck above, through any concealed spaces, such as those above suspended ceilings, and through interstitial structural and mechanical spaces.

(2) They shall be permitted to extend from the floor to the underside of a monolithic or suspended ceiling system where the following conditions are met:

(a) The ceiling system forms a continuous membrane.

(b) A smoke-tight joint is provided between the top of the smoke partition and the bottom of the suspended ceiling.

(c) The space above the ceiling is not used as a plenum.

(3) Smoke partitions enclosing hazardous areas shall be permitted to terminate at the underside of a monolithic or suspended ceiling system where the following conditions are met:

(a) The ceiling system forms a continuous membrane.

(b) A smoke-tight joint is provided between the top of the smoke partition and the bottom of the suspended ceiling.

(c) Where the space above the ceiling is used as a plenum, return grilles from the hazardous area into the plenums are not permitted.

8.7.3 Opening Protective, Penetrations and Joints

8.7.3.1 Doors shall not include louvers.

8.7.3.2 Doors shall be self-closing or automatic-closing.

8.7.3.3 Penetrations for cables, cable trays, conduits, pipes, tubes, vents, wires, and similar items to accommodate electrical, mechanical, plumbing, and communication systems that

pass through a smoke partition shall be protected by a system or material that is capable of limiting the transfer of smoke.

8.7.3.4 Joints made within or at the perimeter of smoke partitions shall be protected with a joint system that is capable of limiting the transfer of smoke.

8.7.3.5 Smoke Dampers. Air-transfer openings in smoke partitions shall be provided with approved smoke dampers designed and tested in accordance with the requirements of any approved code/standard.

8.7.3.6 Smoke Detectors. Dampers in air-transfer openings shall close upon detection of smoke by approved smoke detectors.

8.8 Smoke Barriers

8.8.1 General. Where required smoke barriers shall be provided to subdivide building spaces for the purpose of restricting the movement of smoke.

8.8.2 Continuity

8.8.2.1 Smoke barriers shall be continuous from an outside wall to an outside wall, from a floor to a floor, or from a smoke barrier to a smoke barrier, or by use of a combination thereof.

8.8.2.2 Smoke barriers shall be continuous through all concealed spaces, such as those found above a ceiling, including interstitial spaces.

8.8.3 Opening Protective, Penetrations and Joints

8.8.3.1 Doors in smoke barriers shall close the opening, leaving only the minimum clearance necessary for proper operation, and shall be without louvers or grilles. The clearance under the bottom of the doors shall be a maximum of 3⁄4 in. (19 mm).

8.8.3.2 Latching hardware shall be required on doors in smoke barriers.

8.8.3.3 Doors in smoke barriers shall be self-closing or automatic-closing.

8.8.3.4 Fire window assemblies shall comply with Section 8.6.3.

8.8.3.5 Where a smoke barrier is penetrated by a duct or air-transfer opening, a smoke damper designed and tested in accordance with any of the approved code/standard, shall be installed.

8.8.3.6 Access to the dampers shall be provided for inspection, testing, and maintenance.

8.8.3.7 Access points to fire and smoke dampers in new construction shall be permanently identified by labeling FIRE/SMOKE DAMPER, SMOKE DAMPER and FIRE DAMPER. Smoke dampers in ducts penetrating smoke barriers shall close upon detection of smoke by approved smoke detectors.

8.8.3.8 Penetrations for cables, cable trays, conduits, pipes, tubes, vents, wires, and similar items to accommodate electrical, mechanical, plumbing, and communication systems that pass through a wall, floor, or floor/ceiling assembly constructed as a smoke barrier, or through the ceiling membrane of the roof/ceiling of a smoke barrier assembly, shall be protected by a system or material capable of restricting the transfer of smoke.

8.8.3.9 Joints made within or at the perimeter of smoke barriers or between smokes barriers shall be protected with a joint system that is capable of limiting the transfer of smoke.

Chapter 9 Fire Protection Systems

9.1 General

9.1.1 AHJ shall have the authority to require that construction documents for all fire protection systems be submitted for review and approval and a permit be issued prior to the installation, rehabilitation, or modification.

9.1.1.1 Permits. Permits, where required, shall comply with Section 1.12.

9.1.2 The property owner, occupant, lessee and administrator shall be responsible for the proper testing and maintenance of the equipment and systems.

9.1.3 Obstructions shall not be placed or kept near fire hydrants, fire department inlet connections, or fire protection system control valves in a manner that would prevent such equipment or fire hydrants from being immediately visible and accessible.

9.1.4 A minimum 36 in. (91 mm) of clear space shall be maintained to permit access to and operation of fire protection equipment, fire department inlet connections, or fire protection system control valves. The fire department shall not be deterred or hindered from gaining immediate access to fire protection equipment.

9.1.4.1 An approved clear and unobstructed path shall be provided and maintained for access to the fire department inlet connections.

9.1.5 Detailed records documenting all systems and equipment testing and maintenance shall be kept by the property owner and shall be made available upon request for review by AHJ.

9.1.6 Existing systems shall comply with the clauses of these Provisions.

9.1.7 All fire protection systems and devices shall be maintained in a reliable operating condition and shall be replaced or repaired where defective or recalled.

9.1.8 When a fire protection system is out of service for more than 4 hours in a 24-hour period, a fire watch will be provided for all portions left unprotected by the fire protection system shutdown until the fire protection system has been returned to service.

9.1.9 For occupancies of an especially hazardous nature or where special hazards exist in addition to the normal hazard of the occupancy, or where access for fire apparatus is unduly difficult, or where the size or configuration of the building or contents limits normal fire suppression efforts, AHJ shall have the authority to require additional safeguards consisting of additional fire safety equipment, more than one type of fire safety equipment, or special systems suitable for the protection of the hazard involved.

9.1.10 AHJ shall have the authority to require locking fire department connection (FDC) plugs or caps on all water based fire protection systems.

9.2 Standpipe Systems

9.2.1 General. The design and installation of standpipe systems shall be in accordance with NFPA-14 or any approved code/standard.

9.2.2 Where Required

9.2.2.1 New buildings shall be equipped with a Class I standpipe system installed in accordance with the provisions of Section 9.2.1 where any of the following conditions exist:

(1) More than three stories above grade where the building is protected by an approved automatic sprinkler system

(2) More than two stories above grade where the building is not protected by an approved automatic sprinkler system

(3) More than 50 ft (15 m) above grade and containing intermediate stories or balconies

(4) More than one storey below grade

(5) More than 20 ft (6.1 m) below grade

9.2.2.2 High-rise buildings shall be protected throughout by a Class I standpipe system in accordance with 9.2.2.

9.2.2.3 In new assembly occupancies, regular stages over 1000 ft^2 (93 m^2) in area and all legitimate stages shall be equipped with 1-1⁄2 in. (38 mm) hose lines for first aid firefighting at each side of the stage.

9.2.2.4 In existing assembly occupancies, stages over 1000 ft^2 (93 m^2) in area shall be equipped with 1-1⁄2 in. (38 mm) hose lines for first aid firefighting at each side of the stage.

9.2.2.5 Hose connections shall be in accordance with NFPA 13 and NFPA 14 or any approved code/standard.

9.2.2.6 New and Existing Detention and Correctional Facilities. Class III standpipe and hose systems shall be provided for all non sprinklered buildings.

9.2.3 Inspection, Testing, and Maintenance

9.2.3.1 A standpipe system installed in accordance with these Provisions shall be properly maintained to provide at least the same level of performance and protection as designed.

9.2.3.2 The owner shall be responsible for maintaining the standpipe system and keeping it in good working condition.

9.2.3.3 A standpipe system installed in accordance with these Provisions shall be inspected, tested, and maintained in accordance with NFPA 25 or any approved code/standard.

9.2.3.4 Existing Systems

9.2.3.4.1 Where an existing standpipe system, including yard piping and fire department connection, is modified, the new piping shall be independently tested in accordance with Section 11.4.1 of NFPA 14 or any approved code/standard.

9.2.3.4.2 Modifications that cannot be isolated, such as new valves or the point of connection for new piping, shall not require testing in excess of system static pressure.

9.3 Automatic Sprinklers

9.3.1 General

9.3.1.1 Automatic sprinklers shall be installed and maintained in full operating condition in the occupancies specified in these Provisions.

9.3.1.2 Installations shall be in accordance with NFPA 13/NFPA 13R/NFPA 13D or any approved code/standard.

9.3.1.3 Existing systems shall comply with these Provisions.

9.3.1.4 Sprinkler piping serving not more than six sprinklers for any hazardous area shall be permitted to be connected directly to a domestic water supply system.

9.3.1.5 Sprinkler piping serving hazardous areas as described in 9.3.1.4 shall be provided with an indicating shutoff valve, supervised and installed in an accessible, visible location between the sprinklers and the connection to the domestic water supply.

9.3.1.6 In areas protected by automatic sprinklers, automatic heat-detection devices required by other sections of these Provisions shall not be required.

9.3.1.7 Supervision

9.3.1.7.1 Supervisory Signals

9.3.1.7.1.1 Where supervised automatic sprinkler systems are required by another section of these Provisions, supervisory attachments shall be installed and monitored for integrity in accordance with NFPA 72 or any approved code/standard and a distinctive supervisory signal shall be provided to indicate a condition that would impair the satisfactory operation of the sprinkler system.

9.3.1.7.1.2 Supervisory signals shall sound and shall be displayed either at a location within the protected building that is constantly attended by qualified personnel or at an approved, remotely located receiving facility.

9.3.1.8 Temperature classification. The following practices shall be observed to provide sprinklers of other than ordinary-temperature classification unless other temperatures are determined or unless high temperature sprinklers are used throughout, and temperature selection shall be in accordance with Table 9.3.1.8(a), Table 9.3.1.8(b), and Figure 9.3.1.8:

(1) Sprinklers in the high-temperature zone shall be of the high-temperature classification, and sprinklers in the intermediate-temperature zone shall be of the intermediate-temperature classification.

(2) Sprinklers located within 12 in. (305 mm) to one side or 30 in. (762 mm) above an uncovered steam main, heating coil, or radiator shall be of the intermediate temperature classification.

(3) Sprinklers within 7 ft (2.1 m) of a low-pressure blow off valve that discharges free in a large room shall be of the high-temperature classification.

(4) Sprinklers under glass or plastic skylights exposed to the direct rays of the sun shall be of the intermediate temperature classification.

(5) Sprinklers in an unventilated, concealed space, under an uninsulated roof, or in an unventilated attic shall be of the intermediate-temperature classification.

(6) Sprinklers in unventilated show windows having high-powered electric lights near the ceiling shall be of the intermediate-temperature classification.

(7) Sprinklers protecting commercial-type cooking equipment and ventilation systems shall be of the high- or extra high temperature classification as determined by use of a temperature-measuring device.

(8) Sprinklers protecting residential areas installed near specific heat sources identified in Table 9.3.1.8(c) shall be installed in accordance with Table 9.3.1.8(c).

(9) Ordinary-temperature sprinklers located adjacent to a heating duct that discharges air that is less than 100°F (38°C) are not required to be separated in accordance with Table 9.3.1.8(a).

(10) Sprinklers in walk-in type coolers and freezers with automatic defrosting shall be of the intermediate temperature classification or higher.

9.3.2 Where Required

9.3.2.1 Where required by these Provisions or the referenced codes and standards listed in Chapter 2, automatic sprinkler systems shall be installed in accordance with 9.3.1.

9.3.2.2 Basements exceeding 2500 ft^2 (232 m^2) in new buildings shall be protected throughout by an approved automatic sprinkler system.

9.3.2.3 New buildings housing emergency fire, rescue, or ambulance services shall be protected throughout by approved, supervised automatic sprinkler systems.

9.3.2.4 New Assembly Occupancies

9.3.2.4.1 Assembly occupancies with festival seating shall be protected throughout by an approved, supervised automatic sprinkler system.

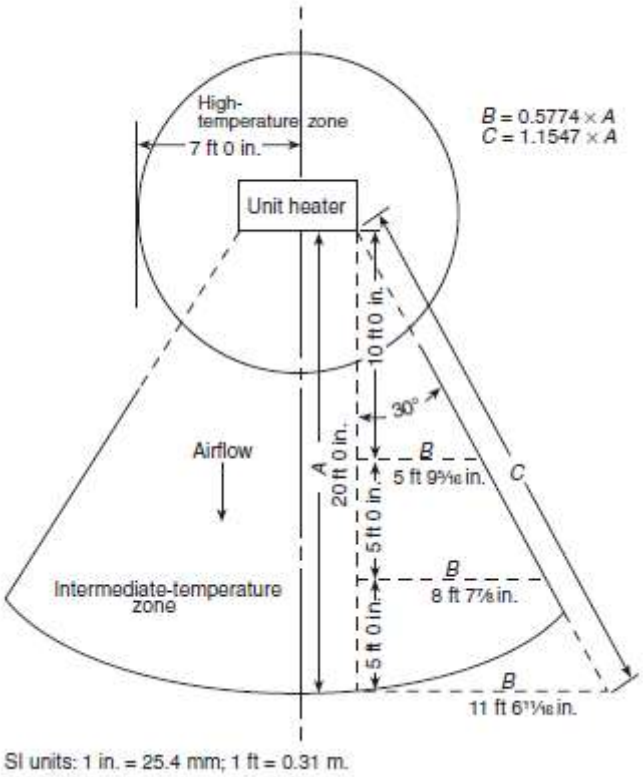

Figure 9.3.1.8 High-Temperature and Intermediate-zones

Table 9.3.1.8(a) Temperature Ratings of Sprinklers Based on Distance from Heat Sources

Type of Heat Condition	Ordinary-Temperature Rating	Intermediate-Temperature Rating	High-Temperature Rating
(1) Heating ducts (a) Above (b) Side and below (c) Diffuser	More than 2 ft 6 in. More than 1 ft 0 in. Any distance except as shown under Intermediate-Temperature Rating column	2 ft 6 in. or less 1 ft 0 in. or less Downward discharge: Cylinder with 1 ft 0 in. radius from edge extending 1 ft 0 in. below and 2 ft 6 in. above Horizontal discharge: Semi cylinder or cylinder with 2 ft (j in. radius in direction of flow extending 1 ft 0 in. below and 2 ft 6 in. above	
(2) Unit heater (a) Horizontal discharge (b) Vertical downward discharge *(for sprinkler below unit heater, see Figure* 9.3.1.8		*Discharge side:* 7 ft 0 in. to 20 ft 0 in. radius pie-shaped cylinder *(see Figure 9*.3.1.8) extending 7 ft 0 in. above and 2 ft 0 in. below heater; also 7 ft 0 in radius cylinder more than 7 ft 0 in: above unit heater 7ft: 0 in. radius cylinder extending upward from an elevation 7 ft 0 in. above unit heater	7 It 0 in. radius cylinder extending 7 ft 0 in. above and 2 ft 0 in. below unit heater 7 ft 0 in. radius cylinder extending from the top of the unit heater to an elevation 7 ft 0 in. above unit heater
3) Steam mains (uncovered) (a) Above (b) Side and below (c) Blow of valve	More than 2 ft 6 in. More than 1 ft 0 in. More than 7 ft 0 in.	2 ft 6 in. or less 1 ft 0 in. or less	7 ft 0 in. or less

For SI units. I in. = 25.4 mm: I ft = 0.3048 m.

Table 9.3.1.8(b) Temperature Ratings of Sprinklers in Specified Locations

Location	Ordinary-Temperature Rating	Intermediate-Temperature Rating	High-Temperature Rating
Skylights Attics Peaked roof: metal or thin boards, concealed or not concealed, insulated or uninsulated Flat roof: metal. not concealed	Do not use Veritilated Ventilated or unventilated	Glass or plastic Ventilated or unventilated Unventilated Note: For uninsulated roof, climate and insulated or uninsulated occupancy can necessitate intermediate sprinklers. Check on job.	
Flat roof: metal, concealed, insulated, or un insulated Show windows	Ventilated	Unventilated Unventilated	

Note: A check of job condition by means of thermometers might be necessary.

Table 9.3.1.8(c) Ratings of Sprinklers in Specified Residential Areas

Heat Sources	Minimum Distance from Edge of Source to Ordinary-Temperature Sprinkler		Minimum Distance from Edge of Source to Intermediate-Temperature Sprinkler	
	in.	mm	in.	mm
Side of open or recessed fireplace	36	914	12	305
Front of recessed fireplace	60	1524	36	914
Coal- or wood-burning stove	42	1067	12	305
Kitchen range	18	457	9	229
Wall oven	18	457	9	229
Hot air flues	18	457	9	229
Uninsulated heat ducts	18	457	9	229
Uninsulated hot water pipes	12	305	6	152
Side of ceiling- or wall-mounted hot	24	607	12	305
air diffusers			18	·157
Front of wall-mounted hot air	36	914	3	76
diffusers			3	76
Hot water heater or furnace	6	152	6	152
Light fixture:			12	305
OW-250W	6	152	36	914
250 W-499 W	12	305	12	305
Side of open or recessed fireplace	36	914	9	229

9.3.2.4.2 Any building containing one or more assembly occupancies where the aggregate occupant load of the assembly occupancies exceeds 300 shall be protected by an approved, supervised automatic sprinkler system as follows:

(1) Throughout the story containing the assembly occupancy

(2) Throughout all stories below the story containing the assembly occupancy

(3) In the case of an assembly occupancy located below the level of exit discharge, throughout all stories intervening between that story and the level of exit discharge, including the level of exit discharge.

9.3.2.4.3 The requirements of Section 9.3.2.4.2 shall not apply to the following:

(1) Assembly occupancies consisting of a single multipurpose room of less than 12,000 ft^2 (1115 m^2) that are not used for exhibition or display.

(2) Gymnasiums, skating rinks, and swimming pools used exclusively for participant sports with no audience facilities for more than 300 persons

(3) Locations in stadia/grounds and arenas as follows:

(a) Over the floor area used for contest, performance, or entertainment, provided that the roof construction is more than 50 ft (15 m) above the floor level, and use is restricted to low fire hazard uses

(b) Over the seating areas, provided that use is restricted to low fire hazard uses

(c) Over open-air concourses where an approved engineering analysis substantiates the ineffectiveness of the sprinkler protection due to building height and combustible loading

(4) Locations in unenclosed stadia/grounds and arenas as follows:

(a) Press boxes of less than 1000 ft^2 (93 m^2)

(b) Storage facilities of less than 1000 ft^2 (93 m^2) if enclosed with not less than 1-hour fire resistance–rated construction

(c) Enclosed areas underneath grandstands

9.3.2.4.4 Stages. Every stage shall be protected by an approved, supervised automatic sprinkler system.

9.3.2.4.4.1 Protection shall be provided throughout the stage and in storerooms, workshops, permanent dressing rooms, and other accessory spaces contiguous to stages.

9.3.2.4.4.2 Sprinklers shall not be required for stages 1000 ft^2 (93 m^2) or less in area and 50 ft (15 m) or less in height where the following criteria are met:

(1) Curtains, scenery, or other combustible hangings are not retractable vertically.

(2) Combustible hangings are limited to borders, legs, a single main curtain, and a single backdrop.

9.3.2.4.4.3 Sprinklers shall not be required under stage areas less than 48 in. (1220 mm) in clear height that are used exclusively for chair or table storage and lined on the inside with 5⁄8 in. (16 mm) type X gypsum wallboard or the approved equivalent.

9.3.2.4.5 Where another clause of these Provisions requires an automatic sprinkler system, the sprinkler system shall be installed in accordance with NFPA 13 or any approved code/standard.

9.3.2.5 Existing Assembly Occupancies

9.3.2.5.1 Assembly occupancies with festival seating where the occupant load exceeds 300 shall be protected throughout by an approved, supervised automatic sprinkler system.

9.3.2.5.2 Any assembly occupancy used or capable of being used for exhibition or display purposes shall be protected throughout by an approved automatic sprinkler system where the exhibition or display area exceeds 20000 ft^2 (1850 m^2).

9.3.2.5.3 The sprinklers specified by Section 9.3.2.5.2 shall not be required where otherwise permitted in the following locations:

(1) Locations in stadia and arenas as follows:

(a) Over the floor area used for contest, performance, or entertainment

(b) Over the seating areas

(c) Over open-air concourses

(2) Locations in unenclosed stadia and arenas as follows:

(a) Press boxes of less than 1000 ft^2 (93 m^2)

(b) Storage facilities of less than 1000 ft^2 (93 m^2) if enclosed with not less than 1-hour fire resistance–rated construction

(c) Enclosed areas underneath grandstands

9.3.2.5.4 Stages. Every stage shall be protected by an approved automatic sprinkler system.

9.3.2.5.4.1 Protection shall be provided throughout the stage and in storerooms, workshops, permanent dressing rooms, and other accessory spaces contiguous to such stages.

9.3.2.5.4.2 Sprinklers shall not be required for stages 2000 ft^2 (186 m^2) or less in area.

9.3.2.5.4.3 Sprinklers shall not be required under stage areas less than 48 in. (1220 mm) in clear height that are used exclusively for chair or table storage.

9.3.2.5.5 Where another clause of these Provisions requires an automatic sprinkler system, the sprinkler system shall be installed in accordance with NFPA 13 or any approved code/standard.

9.3.2.6 New Educational Occupancies

9.3.2.6.1 Educational occupancy buildings exceeding covered area 12,000 ft^2 (1120 m^2) and more than two stories in height, shall be protected throughout by an approved, supervised automatic sprinkler system.

9.3.2.6.2 Educational occupancy buildings four or more stories in height shall be protected throughout by an approved, supervised automatic sprinkler system.

9.3.2.6.3 Every portion of educational buildings below the level of exit discharge shall be protected throughout by an approved, supervised automatic sprinkler system.

9.3.2.7 Existing Educational Occupancies

9.3.2.7.1 In existing educational occupancy buildings exceeding 12,000 ft^2 (1120 m^2), where student occupancy exists below the level of exit discharge, every portion of such floor shall be protected throughout by an approved automatic sprinkler system.

9.3.2.7.2 Automatic sprinkler protection shall not be required where student occupancy exists below the level of exit discharge, provided that windows for rescue and ventilation shall be provided.

9.3.2.8 New Health Care Occupancies

9.3.2.8.1 Buildings containing health care occupancies, having more than 50 beds or high rise building, shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.3, unless otherwise permitted by Section 9.3.2.9.2**.**

9.3.2.8.2 In Type I and Type II construction, alternative protection measures shall be permitted to be substituted for sprinkler protection, without causing a building to be classified as nonsprinklered, in specified areas where AHJ has prohibited sprinklers.

9.3.2.8.3 Listed/approved quick-response or listed/approved residential sprinklers shall be used throughout smoke compartments containing patient sleeping rooms.

9.3.2.8.4 Sprinklers shall not be required in clothes closets of patient sleeping rooms in hospitals where the area of the closet does not exceed 6 ft^2 (0.55 m^2).

9.3.2.9 Existing Health Care Occupancies

9.3.2.9.1 Building having more than 100 beds or high rise buildings shall be protected throughout by an approved, supervised automatic sprinkler system within the stipulated time period specified in these Provisions.

9.3.2.9.2 In Type I and Type II construction, alternative protection measures shall be permitted to be substituted for sprinkler protection in specified areas where AHJ has prohibited sprinklers, without causing a building to be classified as nonsprinklered.

9.3.2.9.3 Sprinklers shall not be required in clothes closets of patient sleeping rooms in hospitals where the area of the closet does not exceed 6 ft^2 (0.55 m^2).

9.3.2.10 New Detention and Correctional Facilities

9.3.2.10.1 All buildings classified as Use Condition II, Use Condition III, Use Condition IV, or Use Condition V shall be protected throughout by an approved, supervised automatic sprinkler system.

9.3.2.10.2 The automatic sprinkler system required Section 9.3.2.11.1 shall be electrically connected to the fire alarm system and shall be fully supervised.

9.3.2.11 Existing Detention and Correctional Facilities

9.3.2.11.1 Existing detention and correctional facilities shall be exempted from the provision of an approved, supervised automatic sprinkler system subject to approval of AHJ.

9.3.2.11.2 If sprinkler system is not installed in detention and correctional occupancies, then, special fire detection and fire extinguishing facilities shall be provided over and above the minimum specified elsewhere in these Provisions.

9.3.2.12 New Hotels and Dormitories.

9.3.2.12.1 All buildings exceeding 12,000 ft^2 (1120 m^2) and more than two stories in height, shall be protected throughout by an approved, supervised automatic sprinkler system.

9.3.2.12.2 Where an automatic sprinkler system is installed, either for total or partial building coverage, the system shall be in accordance with Section 9.3. In buildings four or fewer stories above grade plane, systems in accordance with NFPA 13R or any approved code/standard shall be permitted.

9.3.2.12.3 Listed/approved/approved quick-response or listed/approved residential sprinklers shall be used throughout guest rooms and guest room suites.

9.3.2.13 Existing Hotels and Dormitories

9.3.2.13.1 All high-rise buildings, other than those where each guest room or guest suite has exterior exit access, shall be protected throughout by an approved, supervised automatic sprinkler system.

9.3.2.13.2 Where an automatic sprinkler system is installed, either for total or partial building coverage, the system shall be in accordance with Section 9.3. In buildings four or fewer stories above grade plane, systems in accordance with NFPA 13R or any approved code/standard shall be permitted.

9.3.2.13.3 In guest rooms and in guest room suites, sprinkler installations shall not be required in closets not exceeding 24 ft^2 (2.2 m^2) and in bathrooms not exceeding 55 ft^2 (5.1 m^2).

9.3.2.14 New Apartment Buildings

9.3.2.14.1 All buildings exceeding 12,000 ft^2 (1120 m^2) and more than four stories in height shall be protected throughout by an approved, supervised automatic sprinkler system.

9.3.2.14.2 Closets less than 12 ft^2 (1.1 m^2) in area in individual dwelling units shall not be required to be sprinklered. Closets that contain equipment such as washers, dryers, furnaces, or water heaters shall be sprinklered regardless of size.

9.3.2.14.3 Bathrooms not greater than 55 ft^2 (5.1 m^2) in individual dwelling units shall not be required to be sprinklered.

9.3.2.14.4 Listed/approved quick-response or listed/approved residential sprinklers shall be used throughout all dwelling units.

9.3.2.14.5 Open parking structures that are contiguous with apartment buildings shall be exempt from the sprinkler requirements.

9.3.2.15 Existing Apartment Buildings

9.3.2.15.1 Existing apartment buildings including parking structures shall be exempted from the provision of an approved, supervised automatic sprinkler system.

9.3.2.15.2 If sprinkler system is not installed in apartment buildings, exceeding 12,000 ft^2 (1120 m^2) and more than four stories in height, then, fire detection and fire extinguishing

facilities acceptable to AHJ shall be provided over and above the minimum specified elsewhere in these Provisions.

9.3.2.16 Lodging or Rooming Houses. New and existing lodging or rooming houses sprinkler installations shall not be required.

9.3.2.17 One- and Two-Family Dwellings. New and existing one- and two-family dwellings, sprinkler installations shall not be required.

9.3.2.18 New Residential Board and Care Occupancies

9.3.2.18.1 Sprinklers shall not be required in small board and care homes serving fifty or fewer residents when all occupants have the ability as a group to move reliably to a point of safety.

9.3.2.18.2 New residential board and care occupancies**,** serving fifty or more residents and exceeding 12,000 ft^2 (1120 m^2) and more than two stories in height, shall be protected throughout by an approved automatic sprinkler system installed in accordance with NFPA 13 or any approved code/standard.

9.3.2.18.3 In buildings four or fewer stories above grade plane, systems in accordance with NFPA 13R and NFPA 13D or any approved code/standard, shall be permitted. All habitable areas, closets, roofed porches, roofed decks, and roofed balconies shall be sprinklered.

9.3.2.19 Existing Residential Board and Care Facilities

9.3.2.19.1 Existing residential board and care occupancies shall be exempted from the provision of installation of a sprinkler system.

9.3.2.19.2 If sprinkler system is not installed in residential board and care occupancies, serving fifty or more residents and exceeding 12,000 ft^2 (1120 m^2) and more than two stories in height, then, fire detection and fire extinguishing facilities acceptable to AHJ shall be provided over and above the minimum specified elsewhere in these Provisions.

9.3.2.20 New Mercantile Occupancies

9.3.2.20.1 Mercantile occupancies shall be protected by an approved automatic sprinkler system in accordance with NFPA 13 or any approved code/standard in any of the following specified locations:

(1) Throughout all mercantile occupancies three or more stories in height

(2) Throughout all mercantile occupancies exceeding 12,000 ft^2 (1115 m^2) in gross area

(3) Throughout stories below the level of exit discharge where such stories have an area exceeding 2500 ft^2 (232m^2) and are used for the sale, storage, or handling of combustible goods and merchandise

9.3.2.20.2 Extinguishing Requirements. Bulk merchandising retail buildings shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.3 and the applicable provisions of the Code, NFPA 13, NFPA 30, NFPA 30B or any approved code/standard.

9.3.2.20.3 Mall Buildings

9.3.2.20.3.1 Automatic Extinguishing Systems

9.3.2.20.3.1.1 The mall building and all anchor buildings shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with NFPA 13 or any approved code/standard.

9.3.2.20.3.1.2 The system shall be installed in such a manner that any portion of the system serving tenant spaces can be taken out of service without affecting the operating of the portion of the system serving the mall.

9.3.2.20.3.2 Hose Connections

9.3.2.20.3.2.1 There shall be a hose outlet connected to a system sized to deliver 250 gal/min (946 L/min) at the most hydraulically remote outlet.

9.3.2.20.3.2.2 The outlet shall be supplied from the mall zone sprinkler system and shall be hydraulically calculated.

9.3.2.20.3.2.3 Hose outlets shall be provided at each of the following locations:

(1) Within the mall at the entrance to each exit passage or corridor

(2) At each floor level landing within enclosed stairways opening directly onto the mall

(3) At exterior public entrances to the mall

9.3.2.21 Existing Mercantile Occupancies

9.3.2.21.1 Mercantile occupancies, other than three-story buildings, shall be protected by an approved automatic sprinkler system in accordance with NFPA 13 or any approved code/standard in any of the following specified locations:

(1) Throughout all mercantile occupancies with a story over 15,000 ft^2 (1400 m^2) in area

(2) Throughout all mercantile occupancies exceeding 30,000 ft^2 (2800 m^2) in gross area

(3) Throughout stories below the level of exit discharge where such stories have an area exceeding 2500 ft^2 (232 m^2) and are used for the sale, storage, or handling of combustible goods and merchandise

9.3.2.21.2 Bulk merchandising retail buildings shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.3 and the applicable clauses of these Provisions, NFPA 13, NFPA 30, NFPA 30B or any approved code/standard.

9.3.2.22 Underground and Limited Access Structures. Underground and limited access structures, and all areas and floor levels traversed in traveling to the exit discharge, shall be protected by an approved, supervised automatic sprinkler system in accordance with Section 9.3, unless such structures meet one of the following criteria:

(1) They have an occupant load of 50 or fewer persons in new underground or limited access portions of the structure.

(2) They have an occupant load of 100 or fewer persons in existing underground or limited access portions of the structure.

(3) The structure is a one-story underground or limited access structure that is permitted to have a single exit, with a common path of travel not greater than 50 ft (15 m).

9.3.2.23 High-Rise Buildings

9.3.2.23.1 New high-rise buildings shall be protected throughout by an approved automatic sprinkler system in accordance with Section 9.3 and NFPA 13 or any approved code/standard.

9.3.2.23.2 Existing high-rise buildings more than 100 ft (30 m) high shall be protected throughout by an approved automatic sprinkler system in accordance with this chapter and NFPA 13 or any approved code/standard.

9.3.2.24 New Storage Occupancies

9.3.2.24.1 High-Piled Storage. An automatic sprinkler system shall be installed throughout all occupancies containing areas greater than 2500 ft^2 (232 m^2) for the high-piled storage of combustibles.

9.3.2.24.2 General Storage. An automatic sprinkler system shall be installed throughout all occupancies containing areas greater than 12,000 ft^2 (1115 m^2) for the storage of combustibles.

9.3.2.24.3 An automatic sprinkler system shall be installed throughout all occupancies containing storage commodities classified as Group A Plastics in excess of 5 ft (1.5 m) in height over an area exceeding 2500 ft^2 (232 m^2) in area.

9.3.2.24.4 Mini-Storage Building. An automatic sprinkler system shall be installed throughout all mini-storage buildings greater than 2500 ft^2 (232 m^2) and where any of the individual storage units are separated by less than a 1-hour fire resistance–rated barrier.

9.3.2.24.5 Bulk Storage of Tires. Buildings and structures where the volume for the storage of tires exceeds 20,000 ft^3(566 m^3) shall be equipped throughout with an approved automatic fire sprinkler system.

9.3.2.24.6 Woodworking Operations. An approved automatic fire sprinkler system shall be installed in buildings containing woodworking operations exceeding 2500 ft^2 (232 m^2) that use equipment, machinery, or appliances; that generate finely divided combustible waste; or that use finely divided combustible materials.

9.3.2.25 Existing Storage Occupancies

9.3.2.25.1 Existing storage occupancies shall have an automatic sprinkler system installed in accordance with Sections 9.3.2.25.1 through 9.3.2.25.6.

9.3.2.25.2 If sprinkler system cannot be installed in existing storage occupancies as required in 9.3.2.25.1 due to practical difficulties, then, existing storage occupancies shall be exempted by AHJ from installation of sprinkler system provided special fire detection and fire extinguishing facilities shall be provided over and above the minimum specified elsewhere in these Provisions to ensure life safety intent of these Provisions.

9.3.2.26 New and Existing Day Care. Buildings with unprotected openings, shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.3.

9.3.2.27 New Industrial Occupancies. New industrial occupancies, other than low-hazard industrial occupancies, shall be protected by an approved automatic sprinkler system in accordance with NFPA 13 or any approved code/standard in any of the following locations:

(1) Throughout all industrial occupancies three or more stories in height

(2) Throughout all industrial occupancies exceeding 12,000 ft^2 (1115 m^2) in fire area

(3) Where the total area of all floors, including mezzanines, exceeds 24,000 ft^2 (2230 m^2)

9.3.2.28 Existing Industrial Occupancies

9.3.2.28.1 Existing industrial occupancies shall have an automatic sprinkler system installed as required for new industrial occupancies in accordance with 9.3.2.27.

9.3.2.28.2 If sprinkler system cannot be not installed in existing industrial occupancies as required in 9.3.2.28.1 due to practical difficulties, then, existing industrial occupancies shall be exempted by AHJ from installation of sprinkler system provided special fire detection and fire extinguishing facilities shall be provided over and above the minimum specified elsewhere in these Provisions to ensure life safety intent of these Provisions.

9.3.3 Inspection, Testing, and Maintenance

9.3.3.1 A sprinkler system installed in accordance with these Provisions shall be properly maintained to provide the same level of performance and protection as designed. The owner shall be responsible for maintaining the system and keeping it in good working condition.

9.3.3.2 A sprinkler system installed in accordance with these Provisions shall be inspected, tested, and maintained in accordance with NFPA 25 or any other approved code/standard.

9.3.3.3 Ceiling Tiles and Ceiling Assemblies. Where automatic sprinklers are installed, ceilings necessary for the proper actuation of the fire protection device in accordance with NFPA 13 or any approved code/standard shall be maintained.

9.3.3.4 General Requirements

9.3.3.4.1 Responsibility of the Property Owner or Designated Representative

9.3.3.4.1.1 Responsibility for Inspection, Testing, Maintenance, and Impairment. The property owner or designated representative shall be responsible for properly maintaining a water-based fire protection system.

9.3.3.4.1.2 Freeze Protection. The property owner or designated representative shall ensure that water-filled piping is maintained at a minimum temperature of 40°F (4.4°C) unless an approved anti-freeze solution is utilized.

9.3.3.4.1.2.1 All areas of the building containing water-filled piping that does not have another means of freeze protection shall be maintained at a minimum temperature of 40°F (4.4°C).

9.3.3.4.1.2.2 Aboveground water-filled pipes that pass through open areas, cold rooms, passageways, or other areas exposed to temperatures below 40°F (4.4°C), protected against freezing by insulating coverings, frost proof casings, listed/approved heat tracing systems, or other reliable means shall be maintained at temperatures between 40°F (4.4°C) and 120°F (48.9°C).

9.3.3.4.1.3 Accessibility. The property owner or designated representative shall provide ready accessibility to components of water-based fire protection systems that require inspection, testing, and maintenance.

9.3.3.4.1.4 Notification of System Shutdown or Testing. The property owner or designated representative shall notify AHJ, the fire department, if required, and the alarm-receiving facility before testing or shutting down a system or its supply.

9.3.3.4.1.4.1 The notification of system shutdown or test shall include the purpose for the shutdown, the system or component involved, the estimated time of shutdown or test, and the expected duration of the shutdown or test.

9.3.3.4.1.4.2 AHJ, the fire department, and the alarm receiving facility shall be notified when the system, supply, or component is returned to service or when the test is complete.

9.3.3.4.1.5 Corrections and Repairs. Corrections and repairs shall be performed by qualified maintenance personnel or a qualified contractor.

9.3.3.4.1.6 Changes in Occupancy, Use, Process, or Materials. The property owner or designated representative shall not make changes in the occupancy, the use or process, or the materials used or stored in the building without evaluation of the sprinkler protection systems for their capability to protect the new occupancy, use, or materials.

9.3.3.4.1.9 Information Sign

9.3.3.4.1.9.1 A permanently marked metal or rigid plastic information sign shall be placed at the system control riser supplying an antifreeze loop, dry system, reaction system, or auxiliary system control valve.

9.3.3.4.3 Records

9.3.3.4.3.1 Records shall be made for all inspections, tests, and maintenance of the system and its components and shall be made available to AHJ upon request.

9.3.3.4.3.2 Records shall indicate the following:

(1) The procedure/activity performed (e.g., inspection, test, or maintenance)

(2) The organization that performed the activity

(3) The required frequency of the activity

(4) The results and date of the activity

(5) The name and contact information of the qualified contractor or owner, including lead person for activity

9.3.3.4.3.3 Records shall be maintained by the property owner.

9.3.3.4.3.4 As-built system installation drawings, hydraulic calculations, original acceptance test records, and device manufacturer's data sheets shall be retained for the life of the system.

9.3.3.4.3.5 Subsequent records shall be retained for a period of 1 year after the next inspection, test, or maintenance of that type required by the Code.

9.3.3.5 Sprinkler Systems

9.3.3.5.1 Stock of Spare Sprinklers. A stock of spare sprinklers shall be maintained on the premises so that any sprinklers that have operated or been damaged in any way can be promptly replaced.

9.3.3.5.1.1 Where dry sprinklers of different lengths are installed, spare dry sprinklers shall not be required, provided that a means of returning the system to service is furnished.

9.3.3.5.1.2 One sprinkler wrench as specified by the sprinkler manufacturer shall be provided in the cabinet for each type of sprinkler installed to be used for the removal and installation of sprinklers in the system.

9.3.3.5.1.3 A list of the sprinklers installed in the property shall be posted in the sprinkler cabinet.

9.3.3.5.1.3.1 The list shall include the following:

(1) Sprinkler Identification Number (SIN) if equipped; or the manufacturer, model, orifice, deflector type, thermal sensitivity, and pressure rating

(2) General description

(3) Quantity of each type to be contained in the cabinet

(4) Issue or revision date of the list

9.3.3.5.2 Sprinklers shall not be altered in any respect or have any type of ornamentation, paint, or coatings applied after shipment from the place of manufacture.

9.3.3.5.3 Sprinklers and automatic spray nozzles used for protecting commercial-type cooking equipment and ventilating systems shall be cleaned annually and replaced if required.

9.3.3.5.3.1 Where automatic bulb-type sprinklers or spray nozzles are used and annual examination shows no buildup of grease or other material on the sprinklers or spray nozzles, such sprinklers and spray nozzles shall not be required to be replaced.

9.3.3.5.4 Protective Coverings

9.3.3.5.4.1 Sprinklers protecting spray areas and mixing rooms in resin application areas installed with protective coverings shall continue to be protected against overspray residue so that they will operate in the event of fire.

9.3.3.5.4.2 Sprinklers installed as described in Section 9.3.3.5.4 shall be protected using cellophane bags having a thickness of 0.003 in. (0.076 mm) or less or thin paper bags.

9.3.3.5.4.3 Coverings shall be replaced periodically so that heavy deposits of residue do not accumulate.

9.3.3.5.5 Dry Pipe Systems. Dry pipe systems shall be kept dry at all times.

9.3.3.5.5.1 During nonfreezing weather, a dry pipe system shall be permitted to be left wet if the only other option is to remove the system from service while waiting for parts or during repair activities.

9.3.3.5.5.2 Refrigerated spaces or other areas within the building interior where temperatures are maintained at or below 40°F (4.4°C) shall not be permitted to be left wet.

9.3.3.5.5.3 Air driers shall be maintained in accordance with the manufacturer's instructions.

9.3.3.5.5.4 Compressors used in conjunction with dry pipe sprinkler systems shall be maintained in accordance with the manufacturer's instructions.

9.4 Fire Pumps

9.4.1 General

9.4.1.1 Fire Pumps shall be limited to types of centrifugal single stage and multi-stage of horizontal and vertical shaft design and positive displacements of horizontal and vertical shaft design. Fire Pumps shall be designed and installed as per NFPA 20 or any approved code/standard, and installed and tested and maintained as per NFPA 25 or any approved code/standard. Pumps other than specified pumps having different design features shall be permitted to be installed where such pumps are listed/approved by an accredited tested laboratory.

9.4.1.2 Fire Pump Unit Performance

9.4.1.2.1 The fire pump unit, consisting of a pump, driver and controller, shall perform in compliance with NFPA 20 standard or any approved code/standard as an entire unit when installed or when components have been replaced. A single entity should be designated as having unit responsibility for the pump, driver and controller, transfer switch equipment and accessories. Unit responsibility means responsibility to answer and resolve any and all problems regarding the proper installation, compatibility, performance and acceptance of equipment. Unit responsibility should not construe to mean purchase of all components from single supplier. Unit responsibility should be the responsibility of the installer. When individual components have been replaced, the contractor installing the replaced components must verify that entire unit function as intended.

9.4.1.2.2 The complete fire pump unit shall be feed acceptance tested for proper performance in accordance with the provision 14.2 of NFPA 20 or any approved code/standard. Upon completion of the installation and prior to final acceptance, the installation contractor should coordinate with the field acceptance test, including participation of pump manufacturer and

fire pump controller manufacturer's representative. The acceptance test should demonstrate to the building owner's representative and AHJ that pump performs as intended.

9.4.1.2.3 Certified shop test curves showing head and brake horse power of the pump shall be furnished by the manufacturer to the purchaser.

9.4.1.3 Liquid Supplies Reliability

9.4.1.3.1 The adequacy and dependability of the water source are the primary importance and shall be fully determined with due allowances for its reliability in the future.

9.4.1.3.2 Sources

9.4.1.3.2.1 When the suction supply is from a factory use water system, pump operation at 150 percent of rated capacity should not create hazardous process upsets due to low water pressure.

9.4.1.3.2.2 Any source of water that is adequate in quality, quantity and pressure shall be permitted to provide water supply for a fire pump.

9.4.1.3.2.3 Where the water supply from a public service main is not adequate in quality, quantity or pressure, an alternative water source shall be provided.

9.4.1.3.2.4 The adequacy of water supply shall be determined and evaluated prior to the specification and installation of fire pump.

9.4.1.3.2.5 For liquids other than water, the liquid source for the pump shall be adequate to supply the maximum required flow rate for the simultaneous demands for the required duration and the required number of discharges.

9.4.1.3.3 Stored supply. A stored supply plus reliable automatic refill shall be sufficient to meet the demand placed upon it for the design duration. A stored water supply for any fire protection system should be designed and installed in accordance with NFPA 22 or any approved code/standard.

9.4.1.4 Head and Flow. The pump must demonstrate its capability to deliver 150 percent of the rated flow at head not less than 65% of the rated head and shut off head or churn should not be more than 140 percent (see Figure 9.4.1.4).

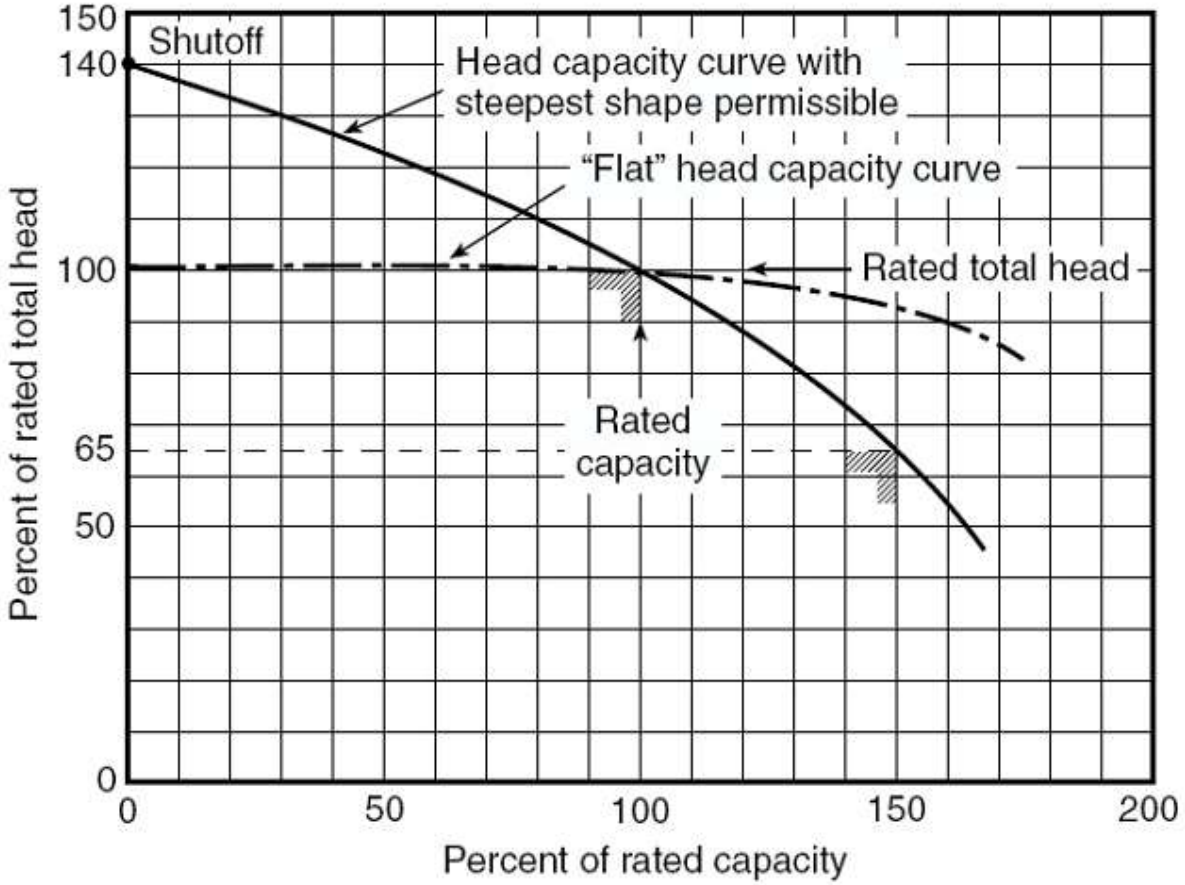

Figure 9.4.1.4 Pump Curve NFPA 20

9.4.1.5 Pump Drivers and Controllers

9.4.1.5.1 Fire pump shall be dedicated to and listed/approved for the fire protection service.

9.4.1.5.2 Acceptable drivers for pumps at a single installation shall be electric motors, diesel engines, steam turbines or a combination thereof.

9.4.1.5.3 A pump shall not equipped with more than one driver.

9.4.1.5.4 Each fire pump shall have its own dedicated driver.

9.4.1.5.5 Each drive shall have its own dedicated controller.

9.4.1.5.6 The driver should be selected to provide the required power to operate the pump at rated speed and maximum pump head under any flow conditions.

9.4.1.5.7 The pump capacities should be based on the calculated system demand. Pressure boost or output of the pump should be determined by the pressure available from the attached water supply. The available power supply for electric pumps must be suitable for the fire pump controller. This information must be made available to the pump manufacturer or manufacturer's representative for the analysis. The data package consisting of pump, driver, controller and accessories must be submitted to AHJ before the supply of fire pump to the site.

9.4.1.5.8 Plans shall be drawn to an indicated scale, on sheets of uniform size, and shall indicate, as a minimum, the items from the following list that pertain to the design of the system:

(1) Name of owner and occupant

(2) Location, including street address

(3) Point of compass

(4) Name and address of installing contractor

(5) Pump make and model number

(6) Pump rating _____ gpm @ _____ psi _____ rpm

(7) Suction main size, length, location, weight, type of material, and point of connection to water supply, as well as size and type of valves, valve indicators, regulators, meters, and valve pits, and depth to top of pipe below grade

(8) Water supply capacity information including the following:

(a) Location and elevation of static and residual test gauge with relation to the riser reference point

(b) Flow location

(c) Static pressure, psi (bar)

(d) Residual pressure, psi (bar)

(e) Flow, gpm (L/min)

(f) Date

(g) Time

(h) Name of person who conducted the test or supplied the information

(i) Other sources of water supply, with pressure or elevation

(9) Pump driver details including manufacturer, horsepower, voltage, or fuel system details

(10) Controller manufacturer, type, and rating

(11) Suction and discharge pipe, fitting, and valve types

(12) Test connection piping and valves

(13) Flow meter details (if used)

(14) Jockey pump and controller arrangement, including sensing line details

9.4.1.5.9 Each pump, driver, controlling equipment, power supply and arrangement, and liquid supply shall be approved by AHJ for the specific field conditions encountered.

9.4.1.6 Pump Operation

9.4.1.6.1 In the event of fire pump operation, qualified personnel shall respond to the fire pump location to determine that the fire pump is operating in a satisfactory manner.

9.4.1.6.2 System Designer

9.4.1.6.2.1 The system designer shall be identified on the system design documents.

9.4.1.6.2.2 Acceptable minimum evidence of qualifications or certification shall be provided when requested by AHJ.

9.4.1.6.2.3 Qualified personnel shall include, but not be limited to, one or more of the following:

(1) Personnel who are factory trained and certified for fire pump system design of the specific type and brand of system being designed

(2) Personnel who are certified by a nationally recognized fire protection certification organization acceptable to AHJ

(3) Personnel who are registered, licensed, or certified by a state or local authority.

9.4.1.6.2.4 Additional evidence of qualification or certification shall be permitted to be required by AHJ.

9.4.1.6.3 System Installer

9.4.1.6.3.1 Installation personnel shall be qualified or shall be supervised by persons who are qualified in the installation, inspection, and testing of fire protection systems.

9.4.1.6.3.2 Minimum evidence of qualifications or certification shall be provided when requested by AHJ.

9.4.1.6.3.3 Qualified personnel shall include, but not be limited to, one or more of the following:

(1) Personnel who are factory trained and certified for fire pump system designed of the specific type and brand of system being designed.

(2) Personnel who are certified by a nationally recognized fire protection certification organization acceptable to AHJ.

(3) Personnel who are registered, licensed, or certified by a state or local authority.

9.4.1.6.3.4 Additional evidence of qualification or certification shall be permitted to be required by AHJ.

9.4.1.6.4 Service Personnel Qualifications and Experience

9.4.1.6.4.1 Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire protection systems.

9.4.1.6.4.2 Qualified personnel shall include, but not be limited to, one or more of the following:

(1) Personnel who are factory trained and certified for fire pump system design of the specific type and brand of system being designed.

(2) Personnel who are certified by a nationally recognized fire protection certification organization acceptable to AHJ.

(3) Personnel who are registered, licensed, or certified by a state or local authority.

(4) Personnel who are employed and qualified by an organization listed/approved by a nationally recognized testing laboratory for the servicing of fire protection systems.

9.4.1.6.4.3 Additional evidence of qualification or certification shall be permitted to be required by AHJ.

9.4.2 Equipment Protection

9.4.2.1 General Requirements. The fire pump, driver, controller, water supply, and power supply shall be protected against possible interruption of service through damage caused by explosion, fire, flood, earthquake, rodents, insects, windstorm, freezing, vandalism, and other adverse conditions.

9.4.2.1.1 Indoor Fire Pump Units

9.4.2.1.1.1 Fire pump units serving high-rise buildings shall be protected from surrounding occupancies by a minimum of 2-hour fire-rated construction or physically separated from the protected building by a minimum of 50 ft (15.3 m).

9.4.2.1.1.2 Indoor fire pump rooms in non-high-rise buildings or in separate fire pump buildings shall be physically separated or protected by fire-rated construction in accordance with Table 9.4.2.1.1.2.

Table 9.4.2.1.1.2 Equipment Protection

Pump Room/House	Building(s) Exposing Pump Room/House	Required Separation
Not sprinklered Not sprinklered Fully sprinklered	Not sprinklered Fully sprinklered Not sprinklered	2 hour fire-rated or 50 ft (15.3 m)
Fully sprinklered	Fully sprinklered	1 hour fire-rated or 50 ft (15.3 m)

9.4.2.1.1.3 The location of and access to the fire pump room shall be preplanned with AHJ.

9.4.2.1.1.4 Except as permitted in 9.4.2.1.1.5, rooms containing fire pumps shall be free from storage, equipment, and penetrations not essential to the operation of the pump and related components.

9.4.2.1.1.5 Equipment related to domestic water distribution shall be permitted to be located within the same room as the fire pump equipment.

9.4.2.1.1.6 The pump room or pump house shall be sized to fit all of the components necessary for the operation of the fire pump and to accommodate the following:

(1) Clearance between components for installation and maintenance

(2) Clearance between a component and the wall for installation and maintenance

(3) Clearance between energized electrical equipment and other equipment

(4) Orientation of the pump to the suction piping to allow compliance with Section 4.14.6.3 of NFPA 20 or any code/standard acceptable to AHJ

9.4.2.1.2 Outdoor Fire Pump Units

9.4.2.1.2.1 Fire pump units that are outdoors shall be located at least 50 ft (15.3 m) away from any buildings and other fire exposures exposing the building.

9.4.2.1.2.2 Outdoor installations shall be required to be provided with protection against possible interruption, in accordance with Section 9.4.2.1.

9.4.2.2 Equipment Access

13.4.2.2.1 The location of and access to the fire pump room(s) shall be pre-planned with AHJ.

9.4.2.2.1.1 Fire pump rooms not directly accessible from the outside shall be accessible through an enclosed passageway from an enclosed stairway or exterior exit.

9.4.2.2.1.2 The enclosed passageway shall have a fire resistance rating not less than the fire-resistance rating of the fire pump room.

9.4.2.3 Heat

9.4.2.3.1 An approved or listed source of heat shall be provided for maintaining the temperature of a pump room or pump house, where required, above 40°F (5°C).

9.4.2.3.2 The requirements of Section 9.4.4.4 shall be followed for higher temperature requirements for internal combustion engines.

9.4.2.4 Normal Lighting. Artificial light shall be provided in a pump room or pump house.

9.4.2.5 Emergency Lighting

9.4.2.5.1 Emergency lighting shall be provided.

9.4.2.5.2 Emergency lights shall not be connected to an engine-starting battery.

9.4.2.6 Ventilation. Provision shall be made for ventilation of a pump room or pump house.

9.4.2.7 Drainage

9.4.2.7.1 Floors shall be pitched for adequate drainage of escaping water away from critical equipment such as the pump, driver, controller, and so forth.

9.4.2.7.2 The pump room or pump house shall be provided with a floor drain that will discharge to a frost-free location.

9.4.3 Valve Supervision

9.4.3.1 Supervised Open. Where provided, the suction valve, discharge valve, bypass valves, and isolation valves on the backflow prevention device or assembly shall be supervised open by one of the following methods:

(1) Central station, proprietary, or remote station signaling service

(2) Local signaling service that will cause the sounding of an audible signal at a constantly attended point

(3) Locking valves open

(4) Sealing of valves and approved weekly recorded inspection where valves are located within fenced enclosures under the control of the owner

9.4.3.2 Supervised Closed. Control valves located in the pipeline to the hose valve header shall be supervised closed by one of the methods allowed in Section 9.4.3.1.

9.4.4 Diesel Engine Driver System Operation

9.4.4.1 Weekly Run

9.4.4.1.1 Engines shall be designed and installed so that they can be started no less than once a fortnightly and run for no less than 30 minutes to attain normal running temperature.

9.4.4.2 Battery Maintenance

9.4.4.2.1 Storage batteries shall be designed and installed so that they can be kept charged at all times.

9.4.4.2.2 Storage batteries shall be designed and installed so that they can be tested frequently to determine the condition of the battery cells and the amount of charge in the battery.

9.4.4.2.3 The automatic feature of a battery charger shall not be a substitute for proper maintenance of battery and charger.

9.4.4.2.4 The battery and charger shall be designed and installed so that periodic inspection of both battery and charger is physically possible.

9.4.4.2.4.1 This inspection shall determine that the charger is operating correctly, the water level in the battery is correct, and the battery is holding its proper charge.

9.4.4.3 Fuel Supply Maintenance

9.4.4.3.1 The fuel storage tanks shall be designed and installed so that they can be kept as full as practical at all times but never below 66 percent (two-thirds) of tank capacity.

9.4.4.3.2 The tanks shall be designed and installed so that they can always be filled by means that will ensure removal of all water and foreign material.

9.4.4.4 Temperature Maintenance

9.4.4.4.1 The temperature of the pump room, pump house, or area where engines are installed shall be designed so that the temperature is maintained at the minimum recommended by the engine manufacturer and is never less than the minimum recommended by the engine manufacturer.

9.4.4.5 Emergency Starting and Stopping

9.4.4.5.1 The sequence for emergency manual operation, arranged in a step-by-step manner, shall be posted on the fire pump engine.

9.4.4.5.2 It shall be the engine manufacturer's responsibility to list any specific instructions pertaining to the operation of this equipment during the emergency operation.

9.4.5 Components

9.4.5.1 Indicators on Controller

9.4.5.1.1 All visible indicators shall be plainly visible.

9.4.5.1.2 Visible indication shall be provided to indicate that the controller is in the automatic position. If the visible indicator is a pilot lamp, it shall be accessible for replacement.

9.4.5.1.3 Separate visible indicators and a common audible fire pump alarm capable of being heard while the engine is running and operable in all positions of the main switch except the off position shall be provided to immediately indicate the following conditions:

(1) Critically low oil pressure in the lubrication system.

(2) High engine temperature.

(3) Failure of engine to start automatically.

(4) Shutdown from over speed.

9.4.5.1.3.1 The controller shall provide means for testing the low oil pressure alarms and circuit in conjunction with the engine circuit testing method.

9.4.5.1.3.2 Instructions shall be provided on how to test the operation of the signals in Section 9.4.5.1.3.

9.4.5.1.4 Separate visible indicators and a common audible signal capable of being heard while the engine is running and operable in all positions of the main switch except the off position shall be provided to immediately indicate the following conditions:

(1) Battery failure or missing battery. Each controller shall be provided with a separate visible indicator for each battery. The battery failure signal shall initiate at no lower than two-thirds of battery nominal voltage rating (8.0 V DC on a 12 V DC system). Sensing shall be delayed to prevent nuisance signals.

(2) Battery charger failure. Each controller shall be provided with a separate visible indicator for battery charger failure and shall not require the audible signal for battery charger failure.

(3) Low air or hydraulic pressure. Where air or hydraulic starting is provided, each pressure tank shall provide to the controller separate visible indicators to indicate low pressure.

(4) System overpressure, for engines equipped with variable speed pressure limiting controls, to actuate at 115 percent of set pressure.

(5) ECM (Engine Control Module) selector switch in alternate ECM position (for engines with ECM controls only).

(6) Fuel injection malfunction (for engines with ECM only).

(7) Low fuel level. Signal at two-thirds tank capacity.

(8) Low air pressure (air-starting engine controllers only). The air supply container shall be provided with a separate visible indicator to indicate low air pressure.

(9) Low engine temperature.

(10) Supervisory signal for interstitial space liquid intrusion.

(11) High cooling water temperature.

9.4.5.1.5 A separate signal silencing switch or valve, other than the controller main switch, shall be provided for the conditions reflected in 9.4.5.1.3 and 9.4.5.1.4.

9.4.5.1.5.1 The switch or valve shall allow the audible device to be silenced for up to 4 hours and then re-sound repeatedly for the conditions in Section 9.4.5.1.3

9.4.5.1.5.2 The switch or valve shall allow the audible device to be silenced for up to 24 hours and then re-sound repeatedly for the conditions in Section 9.4.5.1.4.

9.4.5.1.5.3 The audible device shall re-sound until the condition is corrected or the main switch is placed in the off position.

9.4.5.1.6 The controller shall automatically return to the non-silenced state when the alarm(s) have cleared (returned to normal).

9.4.5.1.6.1 This switch shall be clearly marked as to its function.

9.4.5.2 Signal Devices Remote from Controller

9.4.5.2.1 Where the pump room is not constantly attended, audible or visible signals powered by a source other than the engine starting batteries and not exceeding 230 V shall be provided at a point of constant attendance.

9.4.5.2.2 Remote Indication. Controllers shall be equipped to operate circuits for remote indication of the conditions covered in Sections 9.4.5.1.3, 9.4.5.1.4, and 9.4.5.2.3.

9.4.5.2.3 The remote panel shall indicate the following:

(1) The engine is running (separate signal).

(2) The controller main switch has been turned to the off or manual position (separate signal).

(3)There is trouble on the controller or engine (separate or common signals).

9.4.5.3 Controller Contacts for Remote Indication. Controllers shall be equipped with open or closed contacts to operate circuits for the conditions covered in Section 9.4.5.2.

9.4.6 Field Acceptance Tests

9.4.6.1 The pump manufacturer, the engine manufacturer (when supplied), the controller manufacturer, and the transfer switch manufacturer (when supplied) or their factory authorized representatives shall be present for the field acceptance test.

9.4.6.2 The date, time, and location of the field acceptance test shall be coordinated with AHJ.

9.4.6.3 Pump Room Electrical Wiring. All electric wiring to the fire pump motor(s), including control (multiple pumps) interworking, normal power supply, alternate power supply where provided, and jockey pump, shall be completed and checked by the electrical contractor prior to the initial startup and acceptance test.

9.4.6.4 Certified Pump Curve

9.4.6.4.1 A copy of the manufacturer's certified pump test characteristic curve shall be available for comparison of the results of the field acceptance test.

9.4.6.4.1.1 For water mist positive displacement pumping units, a copy of the manufacturer's certified shop test data for both variable speed and non-variable speed operation shall be available for comparison of the results of the field acceptance test.

9.4.6.4.2 At all flow conditions, including those required to be tested in Section 14.2.6.2 of NFPA 20 or any approved code/standard, the fire pump as installed shall equal the performance as indicated on the manufacturer's certified shop test curve within the accuracy limits of the test equipment.

9.4.6.4.2.1 For water mist positive displacement pumping units with variable speed features, the pump unit as installed shall equal the performance as indicated on the fire pump unit manufacturer's certified shop test data, with variable speed features deactivated within the accuracy limits of the test equipment.

9.4.6.4.2.2 For water mist positive displacement pumping units, the pump unit as installed shall equal the performance as indicated on the fire pump unit manufacturer's certified shop test data, with variable speed features activated within the accuracy limits of the test equipment.

9.4.6.5 System Demand. The actual unadjusted fire pump discharge flows and pressures installed shall meet or exceed the fire protection system's demand.

9.4.7 Record Drawings, Test Reports, Manuals, Special Tools, and Spare Parts

9.4.7.1 One set of record drawings shall be provided to the building owner.

9.4.7.2 One copy of the completed test report shall be provided to the building owner.

9.4.7.3 One set of instruction manuals for all major components of the fire pump system shall be supplied by the manufacturer of each major component.

9.4.7.4 The manual shall contain the following:

(1) A detailed explanation of the operation of the component

(2) Instructions for routine maintenance

(3) Detailed instructions concerning repairs

(4) Parts list and parts identification

(5) Schematic electrical drawings of controller, transfer switch, and fire pump control panels

(6) List of recommended spare parts and lubricants

9.4.7.5 Any special tools and testing devices required for routine maintenance shall be available for inspection by AHJ at the time of the field acceptance test.

9.4.8 Periodic Inspection, Testing, and Maintenance. Fire pumps shall be inspected, tested, and maintained in accordance with NFPA 25 or any approved code/standard.

9.4.9 Component Replacement

9.4.9.1 Positive Displacement Pumps

9.4.9.1.1 Whenever a critical path component in a positive displacement fire pump is replaced, a field test of the pump shall be performed.

9.4.9.1.2 If components that do not affect performance are replaced, such as shafts, then only a functional test shall be required to ensure proper installation and reassembly.

9.4.9.1.3 If components that affect performance are replaced, such as rotors, plungers, and so forth, then a retest shall be conducted by the pump manufacturer or designated representative or qualified persons acceptable to AHJ.

9.4.9.1.3.1 For water mist positive displacement pumping units, the retest shall include the pump unit as a whole.

9.4.9.1.4 Field Retest Results

9.4.9.1.4.1 The field retest results shall be compared to the original pump performance as indicated by the fire pump manufacturer's original factory-certified test curve, whenever it is available.

9.4.9.1.4.2 The field retest results shall meet or exceed the performance characteristics as indicated on the pump nameplate, and the results shall be within the accuracy limits of field testing as stated elsewhere in NFPA 20 or any approved code/standard.

9.5 Water Supply

9.5.1 Private fire service mains shall be installed in accordance with NFPA 13 and NFPA 24 or any approved code/standard.

9.5.2 The installation of devices to protect the public water supply from contamination shall comply with the provisions of NFPA 13, NFPA 13D, NFPA 13R and NFPA 24 or any approved code/standard.

9.5.2.1 Backflow prevention devices shall be inspected, tested, and maintained in accordance with the requirements of NFPA 25 or any approved code/standard.

9.5.3 Inspection, Testing, and Maintenance

9.5.3.1 A private fire service main installed in accordance with these Provisions shall be properly maintained to provide at least the same level of performance and protection as designed. The owner or designated representative shall be responsible for maintaining the system and keeping it in good working condition.

9.5.3.2 A private fire service main installed in accordance with these Provisions shall be inspected, tested, and maintained.

9.6 Portable Fire Extinguishers

9.6.1 General Requirements

9.6.1.1 Scope. The selection, installation, inspection, maintenance, recharging, and testing of portable fire extinguishers shall be in accordance with NFPA 10 or approved any code/standard and Section 9.6.

9.6.1.1.1 The requirements given herein are minimum.

9.6.1.1.2 The requirements shall not apply to permanently installed systems for fire extinguishment, even where portions of such systems are portable (such as hose and nozzles attached to a fixed supply of extinguishing agent).

9.6.1.2 Where Required. Fire extinguishers shall be provided in all occupancies except one to two family dwellings.

9.6.1.3 Labeling

9.6.1.3.1 Portable fire extinguishers used to comply with Section 9.6 shall be approved/ labeled.

9.6.1.3.2 Each fire extinguisher shall be marked with the following:

(1) Identification of the labeling organization

(2) Product category indicating the type of extinguisher

(3) Extinguisher classification

(4) Performance and fire test standards that the extinguisher meets or exceeds

(5) Date of expiry

9.6.1.4 Identification of Contents. A fire extinguisher shall have a label, tag, or stencil attached to it providing the following information:

(1) The content's product name as it appears on the manufacturer's Material Safety Data Sheet (MSDS)

(2) Manufacturer's or service agency's name, mailing address, and phone number

9.6.1.5 Instruction Manual

9.6.1.5.1 The owner or the owner's agent shall be provided with a fire extinguisher instruction manual that details condensed instructions and cautions necessary to the installation, operation, inspection, and maintenance of the fire extinguisher(s).

9.6.1.5.2 The manual shall refer to NFPA 10 or any approved code/standard as a source of detailed instruction.

9.6.1.6 Obsolete Fire Extinguishers. The following types of fire extinguishers are considered obsolete and shall be removed from service:

(1) Soda acid

(2) Chemical foam (excluding film-forming agents)

(3) Vaporizing liquid (e.g., carbon tetrachloride)

(4) Cartridge-operated water

(5) Cartridge-operated loaded stream

(6) Copper or brass shell (excluding pump tanks) joined by soft solder or rivets

(7) Carbon dioxide extinguishers with metal horns

(8) Solid charge–type AFFF extinguishers (paper cartridge)

(9) Pressurized water fire extinguishers manufactured prior to 1971

(10) Any extinguisher that needs to be inverted to operate

(11) Any stored pressure extinguisher manufactured prior to 1955

(12) Any extinguishers with 4B, 6B, 8B, 12B, and 16B fire ratings

(13) Stored-pressure water extinguishers with fiberglass shells (pre-1976)

9.6.1.6.1 Any fire extinguisher that can no longer be serviced in accordance with the manufacturer's maintenance manual is considered obsolete and shall be removed from service.

9.6.2 Selection of Portable Fire Extinguishers

9.6.2.1 General Requirements. The selection of fire extinguishers for a given situation shall be determined by the applicable requirements of Sections 5.2 through 5.6 of NFPA 10 or any approved code/standard and the following factors shall be considered:

(1) Type of fire most likely to occur

(2) Size of fire most likely to occur

(3) Hazards in the area where the fire is most likely to occur

(4) Energized electrical equipment in the vicinity of the fire

(5) Ambient temperature conditions

(6) Other factors

9.6.2.1.1 Portable fire extinguishers shall be installed as a first line of defense to cope with fires of limited size.

9.6.2.1.2 The selection of extinguishers shall be independent of whether the building is equipped with automatic sprinklers, standpipe and hose, or other fixed protection equipment.

9.6.2.2 Classification of Fires. See Section 3.3.95.

9.6.2.3 Extinguisher Classification System

9.6.2.3.1 The classification of fire extinguishers shall consist of a letter that indicates the class of fire on which a fire extinguisher has been found to be effective.

9.6.2.3.1.1 Fire extinguishers classified for use on Class A or Class B fire hazard shall be required to have a rating number preceding the classification letter that indicates the relative extinguishing effectiveness.

9.6.2.3.1.2 Fire extinguishers classified for use on Class C, Class D, or Class K hazards shall not be required to have a number preceding the classification letter.

9.6.2.3.2 Fire extinguishers shall be selected for the class(es) of hazards to be protected.

9.6.2.3.2.1 Fire extinguishers for the protection of a particular hazard (Class A, B, C, D, K Fire) shall be selected from types that are specifically labeled for use on respective Classes of fire.

9.6.2.3.2.2 Wheeled fire extinguishers shall be considered for hazard protection in areas in which a fire risk assessment has shown the following:

(1) High hazard areas are present

(2) Limited available personnel are present, thereby requiring an extinguisher that has the following features:

(a) High agent flow rate

(b) Increased agent stream range

(c) Increased agent capacity

9.6.2.4 Classification of Hazards

9.6.2.4.1 Classifying Occupancy Hazard. Rooms or areas shall be classified as being light hazard, ordinary hazard, or extra hazard.

9.6.2.4.1.1 Light Hazard. Light hazard occupancies consist of fire hazards having normally expected quantities of Class A combustible furnishings, and/or the total quantity of Class B flammables typically expected to be present is less than 1 gal (3.8 L) in any room or area.

9.6.2.4.1.2 Ordinary Hazard. Ordinary hazard occupancies consist of fire hazards that only occasionally contain Class A combustible materials beyond normal anticipated furnishings, and/or the total quantity of Class B flammables typically expected to be present is from 1 gal to 5 gal (3.8 L to 18.9 L) in any room or area.

9.6.2.4.1.3 Extra Hazard. Extra hazard occupancies consist of fire hazards involved with the storage, packaging, handling, or manufacture of Class A combustibles, and/or the total quantity of Class B flammables expected to be present is more than 5 gal (18.9 L) in any room or area.

9.6.2.4.1.4 Limited areas of greater or lesser hazard shall be protected as required.

9.6.2.5 Selection for Specific Hazards

9.6.2.5.1 Class B Fires

9.6.2.5.1.1 Extinguishers for Pressurized Flammable Liquids and Pressurized Gas Fires

9.6.2.5.1.1.1 Selection of fire extinguishers for this type of hazard shall be made on the basis of recommendations by manufacturers of this specialized equipment.

9.6.2.5.1.1.2 Large capacity dry chemical extinguishers of 10 lb (4.54 kg) or greater and a discharge rate of 1 lb/sec (0.45kg/sec) or more shall be used to protect these hazards.

9.6.2.5.2 Three-Dimensional Fires. Large capacity dry chemical extinguishers of 10 lb (4.54 kg) or greater and having a discharge rate of 1 lb/sec (0.45 kg/sec) or more shall be used to protect these hazards.

9.6.2.5.3 Water-Soluble Flammable Liquid Fires (Polar Solvents). Aqueous film-forming foam (AFFF) and film-forming fluoro protein foam (FFFP) types of fire extinguishers shall not be used for the protection of water-soluble flammable liquids, such as alcohols, acetone, esters, ketones, and so forth, unless specifically referenced on the fire extinguisher name plate.

9.6.2.5.4 Obstacle Fires. Selection of a fire extinguisher for this type of hazard shall be based on one of the following:

(1) Extinguisher containing a vapor-suppressing foam agent

(2) Multiple extinguishers containing non-vapor-suppressing Class B agents intended for simultaneous application

(3) Larger capacity extinguishers of 10 lb (4.54 kg) or greater and a minimum discharge rate of 1 lb/sec (0.45 kg/sec)

9.6.2.5.5 Class K Cooking Media Fires. Fire extinguishers provided for the protection of cooking appliances that use combustible cooking media (vegetable or animal oils and fats) shall be labeled for Class K fires.

9.6.2.5.5.1 Where a hazard is protected by an automatic fire protection system, a placard shall be conspicuously placed near the extinguisher that states that the fire protection system shall be actuated prior to using the fire extinguisher.

9.6.2.5.6 Electronic Equipment Fires. Fire extinguishers for the protection of delicate electronic equipment shall be selected from types specifically approved and labeled for Class C hazards.

9.6.2.5.6.1 Dry chemical fire extinguishers shall not be installed for the protection of delicate electronic equipment.

9.6.2.5.7 Areas Containing Oxidizers

9.6.2.5.7.1 Only water-type extinguishers shall be installed in areas containing oxidizers, such as pool chemicals.

9.6.2.5.7.2 Multipurpose dry chemical fire extinguishers shall not be installed in areas containing oxidizers, such as pool chemicals.

9.6.2.5.8 Class D Combustible Metal Fires. Fire extinguishers or containers of Class D extinguishing agents provided for the protection of Class D fires shall be listed/approved and labeled for Class D fires.

9.6.2.5.8.1 Class D fire extinguishers and agents shall be compatible with the specific metal for which protection is provided.

9.6.3 Installation of Portable Fire Extinguishers

9.6.3.1 General

9.6.3.1.1 Number of Extinguishers. The minimum number of fire extinguishers needed to protect a property shall be determined as outlined in 9.6.3.

9.6.3.1.1.2 Fire extinguishers having ratings less than those specified in Table 9.6.3.2.1.1 and Table 9.6.3.3.1.1 shall be permitted to be installed, provided they are not used in fulfilling the minimum protective requirements of this subsection, except as modified in 9.6.3.2.1.4, 9.6.3.2.1.5, and 9.6.3.3.1.1.1.

9.6.3.1.2 Extinguisher Readiness. Portable fire extinguishers shall be maintained in a fully charged and operable condition and shall be kept in their designated places at all times when they are not being used.

9.6.3.1.3 Placement

9.6.3.1.3.1 Fire extinguishers shall be conspicuously located where they are readily accessible and immediately available in the event of fire.

9.6.3.1.3.2 Fire extinguishers shall be located along normal paths of travel, including exits from areas.

9.6.3.1.3.3 Visual Obstructions

9.6.3.1.3.3.1 Fire extinguishers shall not be obstructed or obscured from view.

9.6.3.1.3.3.2 In large rooms and in certain locations where visual obstructions cannot be completely avoided, means shall be provided to indicate the extinguisher location.

9.6.3.1.3.3.3 Where signs are used to indicate fire extinguisher location, the signs shall comply with the following:

(1) They shall be located in close proximity to the extinguisher.

(2) They shall be visible from the normal path of travel.

9.6.3.1.3.4 Portable fire extinguishers other than wheeled extinguishers shall be installed using any of the following means:

(1) Securely on a hanger intended for the extinguisher

(2) In the bracket supplied by the extinguisher manufacturer

(3) In a bracket approved for such purpose

(4) In cabinets or wall recesses

9.6.3.1.3.5 Wheeled fire extinguishers shall be located in designated locations.

9.6.3.1.3.6 Fire extinguishers installed in vehicles or under other conditions where they are subject to dislodgement shall be installed in approved strap-type brackets specifically designed for this application.

9.6.3.1.3.7 Fire extinguishers installed under conditions where they are subject to physical damage (e.g., from impact, vibration, the environment) shall be protected against damage.

9.6.3.1.3.8 Installation Height

9.6.3.1.3.8.1 Fire extinguishers having a gross weight not exceeding 40 lb (18.14 kg) shall be installed so that the top of the fire extinguisher is not more than 5 ft (1.53 m) above the floor.

9.6.3.1.3.8.2 Fire extinguishers having a gross weight greater than 40 lb (18.14 kg) (except wheeled types) shall be installed so that the top of the fire extinguisher is not more than 3-1⁄2 ft (1.07 m) above the floor.

9.6.3.1.3.8.3 In no case shall the clearance between the bottom of the hand portable fire extinguisher and the floor be less than 4 in. (102 mm).

9.6.3.1.3.9 Label Visibility

9.6.3.1.3.9.1 Extinguishers' operating instructions shall be located on the front of the extinguisher and shall be clearly visible.

9.6.3.1.3.9.2 Hazardous materials identification systems (HMIS) labels, 6-year maintenance labels, hydrostatic test labels, or other labels shall not be located or placed on the front of the extinguisher.

9.6.3.1.3.9.3 The restrictions of Section 9.6.3.1.3.9.2 shall not apply to original manufacturer's labels, labels that specifically relate to the extinguisher's operation or fire classification, or inventory control labels specific to that extinguisher.

9.6.3.1.3.10 Cabinets

9.6.3.1.3.10.1 Cabinets housing fire extinguishers shall not be locked, except where fire extinguishers are subject to malicious use and cabinets include a means of emergency access.

9.6.3.1.3.10.2 The location of fire extinguishers shall be marked conspicuously.

9.6.3.1.3.10.3 Fire extinguishers mounted in cabinets or wall recesses shall be placed so that the fire extinguisher's operating instructions face outward.

9.6.3.1.3.10.4 Where fire extinguishers are installed in closed cabinets that are exposed to elevated temperatures, the cabinets shall be provided with screened openings and drains.

9.6.3.1.3.10.5 Cabinets or wall recesses for fire extinguishers shall be installed such that the extinguisher mounting heights specified in Sections 9.6.3.1.3.8.1 and 9.6.3.1.3.8.2 are met.

9.6.3.1.3.11 Fire extinguishers shall not be exposed to temperatures outside of the listed/approved temperature range shown on the fire extinguisher label.

9.6.3.1.4 Electronic Monitoring and Alarm System

9.6.3.1.4.1 The connection to the electronic monitoring device shall be continuously supervised for integrity.

9.6.3.1.4.2 The power source for the electronic monitoring device shall be supervised for continuity of power.

9.6.3.2 Installations for Class A Hazards

9.6.3.2.1 Fire Extinguisher Size and Placement for Class A Hazards

9.6.3.2.1.1 Minimal sizes of fire extinguishers for the listed/approved grades of hazards shall be provided on the basis of Table 9.6.3.2.1.1, except as modified by Sections 9.6.3.2.1.4 and 9.6.3.2.1.5.

Table 9.6.3.2.1.1 Fire Extinguisher Size and Placement for Class A Hazards

Criteria	Light Hazard Occupancy	Ordinary Hazard Occupancy	Extra Hazard Occupancy
Minimum rated single extinguisher	2-A	2-A	4-A
Maximum floor area per unit of A	3000 ft^2	1500 ft^2	1000 ft^2
Maximum floor area for extinguisher	11,250 ft^2	11,250 ft^2	11,250 ft^2
Maximum travel distance to extinguisher	75 ft	75 ft	75 ft

For SI units, 1 ft = 0.305 m; 1 ft^2 = 0.0929 m^2.
Note: For maximum floor area explanations, see E.3.3 of NFPA 10.

9.6.3.2.1.2 The minimum number of extinguishers for Class A hazards shall be sufficient to meet the requirements of Sections 9.6.3.2.1.2.1 through 9.6.3.2.1.2.3.

9.6.3.2.1.2.1 The minimum number of fire extinguishers for Class A hazards for each floor of a building shall be determined by dividing the total floor area by the maximum area to be protected per extinguisher as determined by Table 9.6.3.2.1.1.

9.6.3.2.1.2.2 Fire extinguishers shall be located so that the maximum travel distances shall not exceed 75 ft (22.9 m), except as modified by Section 9.6.3.2.1.4.

9.6.3.2.1.2.3 Where the quantity of extinguishers required to satisfy Section 9.6.3.2.1.2.2 exceeds the number calculated in Section 9.6.3.2.1.2.1, additional extinguishers shall be installed.

9.6.3.2.1.3 Smaller fire extinguishers that are rated on Class B and Class C fires but do not have a minimum 1-A rating shall not be used to meet the requirements of 9.6.3.2.1.

9.6.3.2.1.4 Fire extinguishers of lesser rating shall be permitted to be installed but shall not be considered as fulfilling any part of the requirements of Table 9.6.3.2.1.1, except as permitted in Sections 9.6.3.2.1.4(A) and 9.6.3.2.1.4(B).

(A) Up to two water-type extinguishers, each with 1-A rating, shall be permitted to be used to fulfill the requirements of one 2-A rated extinguisher.

(B) Two 2½ gal (9.46 L) water-type extinguishers shall be permitted to be used to fulfill the requirements of one 4-A rated extinguisher.

9.6.3.2.1.5 Up to one-half of the complement of fire extinguishers specified in Table 9.6.3.2.1.1 shall be permitted to be replaced by uniformly spaced 1-½ in. (38 mm) hose stations for use by the occupants of the building.

9.6.3.2.1.5.1 Where hose stations are so provided, they shall conform to NFPA 14 or any approved code/standard.

9.6.3.2.1.5.2 The location of hose stations and the placement of fire extinguishers shall be such that the hose stations do not replace more than every other fire extinguisher.

9.6.3.2.1.6 Where the area of the floor of a building is less than that specified in Table 9.6.3.2.1.1, at least one fire extinguisher of the minimum size required shall be provided.

9.6.3.2.1.7 The protection requirements shall be permitted to be fulfilled with fire extinguishers of higher rating, provided the travel distance to such larger fire extinguishers does not exceed 75ft (22.9 m).

9.6.3.3 Installations for Class B Hazards

9.6.3.3.1 Spill Fires

9.6.3.3.1.1 Minimum ratings of fire extinguishers for the listed/approved grades of hazard shall be provided in accordance with Table 9.6.3.3.1.1.

Table 9.6.3.3.1.1 Fire Extinguisher Size and Placement for Class B Hazards

Type of Hazard	Basic Minimum Extinguisher Rating	Maximum Travel Distance to Extinguishers	
		ft	m
Light (low)	5-B	30	9.14
	10-B	50	15.25
Ordinary (moderate)	10-B	30	9.14
	20-B	50	15.25
Extra (high)	40-B	30	9.14
	80-B	50	15.25

Note: The specified ratings do not imply that fires of the magnitudes indicated by these ratings will occur, but rather they are provided to give the operators more time and agent to handle difficult spill fires that have the potential to occur.

9.6.3.3.1.1.1 Two or more fire extinguishers of lower rating shall not be used to fulfill the protection requirements of Table 9.6.3.3.1.1 except as permitted by Sections 9.6.3.3.1.1.2 and 9.6.3.3.1.1.3.

9.6.3.3.1.1.2 Up to three AFFF or FFFP fire extinguishers of at least 2-1⁄2 gal (9.46 L) capacity shall be permitted to be used to fulfill extra hazard requirements.

9.6.3.3.1.1.3 Two AFFF or FFFP fire extinguishers of at least 1.6 gal (6 L) capacity shall be permitted to be used to fulfill ordinary hazard requirements.

9.6.3.3.1.2 Fire extinguishers of lesser rating, desired for small specific hazards within the general hazard area, shall be permitted to be installed but shall not be considered as fulfilling any part of the requirements of Table 9.6.3.3.1.1, unless permitted by Sections 9.6.3.3.1.1.1 or 9.6.3.3.1.1.2.

9.6.3.3.1.3 Fire extinguishers shall be located so that the maximum travel distances do not exceed those specified in Table 9.6.3.3.1.1.

9.6.3.3.1.4 The protection requirements shall be permitted to be fulfilled with fire extinguishers of higher ratings, provided the travel distance to such larger fire extinguishers does not exceed 50ft (15.25 m).

9.6.3.3.2 Flammable Liquids of Appreciable Depth

9.6.3.3.2.1 Portable fire extinguishers shall not be installed as the sole protection for flammable liquid hazards of appreciable depth where the surface area exceeds 10 ft^2 (0.93 m^2).

9.6.3.3.2.2 Where personnel who are trained in extinguishing fires in the protected hazards are located on the premises and capable of responding immediately, the maximum surface area shall not exceed 20 ft^2 (1.86 m^2).

9.6.3.3.2.3 For flammable liquid hazards of appreciable depth, a Class B fire extinguisher shall be provided on the basis of at least 2 numerical units of Class B extinguishing potential per 1 ft^2 (0.09 m^2) of flammable liquid surface of the largest hazard area.

9.6.3.3.2.4 AFFF- or FFFP-type fire extinguishers shall be permitted to be provided on the basis of 1-B of protection per 1 ft^2 (0.09 m^2) of hazard.

9.6.3.3.2.5 Two or more fire extinguishers of lower ratings, other than AFFF- or FFFP-type fire extinguishers, shall not be used in lieu of the fire extinguisher required for the largest hazard area.

9.6.3.3.2.6 Up to three AFFF- or FFFP-type fire extinguishers shall be permitted to fulfill the requirements, provided the sum of the Class B ratings meets or exceeds the value required for the largest hazard area.

9.6.3.3.2.7 Travel distances for portable fire extinguishers shall not exceed 50 ft (15.25 m).

9.6.3.3.2.7.1 Scattered or widely separated hazards shall be individually protected.

9.6.3.3.2.7.2 A fire extinguisher in the proximity of a hazard shall be located to be accessible in the presence of a fire without undue danger to the operator.

9.6.3.3.3 Obstacle, Gravity/Three-Dimensional, and Pressure Fire Hazards

9.6.3.3.3.1 Where hand portable fire extinguishers are installed or positioned for obstacle, gravity/three dimensional, or pressure fire hazards, the actual travel distance to hazard shall not exceed 30 ft (1 m) unless otherwise specified.

9.6.3.3.3.2 Where wheeled fire extinguishers of 125 lb (56.7 kg) agent capacity or larger are installed or positioned for obstacle, gravity/three-dimensional, or pressure fire hazards, the actual travel distance to hazard shall not exceed 100 ft (30.5 m) unless otherwise specified.

9.6.3.4 Installations for Class C Hazards

9.6.3.4.1 Fire extinguishers with Class C ratings shall be required where energized electrical equipment can be encountered.

9.6.3.4.2 The requirement in Section 9.6.3.4.1 shall include situations where fire either directly involves or surrounds electrical equipment.

9.6.3.4.3 Because fire is a Class A or Class B hazard, the fire extinguishers shall be sized and located on the basis of the anticipated Class A or Class B hazard.

9.6.3.5 Installations for Class D Hazards

9.6.3.5.1 Fire extinguishers or extinguishing agents with Class D ratings shall be provided for fires involving combustible metals.

9.6.3.5.2 Fire extinguishers or extinguishing agents (media) shall be located not more than 75 ft (22.9 m) of travel distance from the Class D hazard.

9.6.3.5.3 Portable fire extinguishers or extinguishing agents (media) for Class D hazards shall be provided in those work areas where combustible metal powders, flakes, shavings, chips, or similarly sized products are generated.

9.6.3.5.4 Size determination shall be on the basis of the specific combustible metal, its physical particle size, area to be covered, and recommendations by the fire extinguisher manufacturer based on data from control tests.

9.6.3.6 Installations for Class K Hazards

9.6.3.6.1 Class K fire extinguishers shall be provided for hazards where there is a potential for fires involving combustible cooking media (vegetable or animal oils and fats).

9.6.3.6.2 Maximum travel distance shall not exceed 30 ft (9.15 m) from the hazard to the extinguishers.

9.6.3.6.3 All solid fuel cooking appliances (whether or not under a hood) with fire boxes of 5 ft^3 (0.14 m^3) volume or less shall have at least a listed/approved 2-A rated water-type fire extinguisher or 1.6 gal (6 L) wet chemical fire extinguisher that is listed/approved for Class K fires.

9.6.4 Inspection, Maintenance and Recharging

9.6.4.1 General

9.6.4.1.1 Responsibility. The owner or designated agent or occupant of a property in which fire extinguishers are located shall be responsible for inspection, maintenance, and recharging.

9.6.4.1.2 Personnel

9.6.4.1.2.1 Persons performing maintenance and recharging of extinguishers shall be certified by Government Approved Bodies acceptable to AHJ.

9.6.4.1.2.1.1 Persons training to become certified shall be permitted to perform maintenance and recharging of extinguishers under the direct supervision and in the immediate presence of a certified person.

9.6.4.1.2.2 Persons performing maintenance and recharging of extinguishers shall be trained and shall have available the appropriate manufacturer's servicing manual(s), the correct tools, recharge materials, lubricants, and manufacturer's replacement parts or parts specifically listed/approved for use in the fire extinguisher.

9.6.4.1.2.3 Persons performing inspections shall be properly trained.

9.6.4.1.3 Replacement While Servicing. Fire extinguishers removed from service for maintenance or recharging shall be replaced by a fire extinguisher suitable for the type of hazard being protected and shall be of at least equal rating.

9.6.4.1.4 Tags or Labels

9.6.4.1.4.1 Tags or labels intended for recording inspections, maintenance, or recharging shall be affixed so as not to obstruct the fire extinguisher use, fire extinguisher classification, or manufacturer's labels.

9.6.4.1.4.2 Labels indicating fire extinguisher use or classification or both shall be permitted to be placed on the front of the fire extinguisher.

9.6.4.2 Inspection

9.6.4.2.1 Inspection Frequency

9.6.4.2.1.1 Fire extinguishers shall be manually inspected when initially placed in service.

9.6.4.2.1.2 Fire extinguishers and Class D extinguishing agents shall be inspected either manually or by means of an electronic monitoring device/system at intervals not exceeding 31 days.

9.6.4.2.1.2.1 Fire extinguishers and Class D extinguishing agents shall be inspected at least once per calendar month.

9.6.4.2.1.4 Extinguishers that are electronically monitored for location only, such as those monitored by means of a switch to indicate when the extinguisher is removed from its bracket or cabinet, shall be manually inspected in accordance with 9.6.4.2.2.

9.6.4.2.2 Inspection Procedures. Periodic inspection or electronic monitoring of fire extinguishers shall include a check of at least the following items:

(1) Location in designated place

(2) No obstruction to access or visibility

(3) Pressure gauge reading or indicator in the operable range or position

(4) Fullness determined by weighing or hefting

(5) Condition of tires, wheels, carriage, hose, and nozzle for wheeled extinguishers

(6) Indicator for non-rechargeable extinguishers using push to test pressure indicators

9.6.4.2.2.1 In addition to, fire extinguishers shall be visually inspected in accordance with if they are located where any of the following conditions exists:

(1) High frequency of fires in the past

(2) Severe hazards

(3) Locations that make fire extinguishers susceptible to mechanical injury or physical damage

(4) Exposure to abnormal temperatures or corrosive atmospheres

9.6.4.2.2.2 Where required by Section 9.6.4.2.2.1, the following inspection procedures shall be in addition to those addressed in Section 9.6.4.2.2:

(1) Verify that operating instructions on name plates are legible and face outward

(2) Check for broken or missing safety seals and tamper indicators

(3) Examine for obvious physical damage, corrosion, leakage, or clogged nozzle

9.6.4.2.2.3 Inspection Procedure for Containers of Class D Extinguishing Agent. Periodic inspection of containers of Class D extinguishing agent used to protect Class D hazards shall include verification of at least the following:

(1) Located in designated place

(2) No obstruction to access or visibility

(3) Lid is sealed

(4) Fullness by hefting or weighing

(5) No obvious physical damage to container

9.6.4.2.4 Inspection Record Keeping

9.6.4.2.4.1 Manual Inspection Records

9.6.4.2.4.1.1 Where manual inspections are conducted, records for manual inspections shall be kept on the dedicated register and a tag attached to the fire extinguisher, on an inspection checklist maintained on file, or by an electronic method.

9.6.4.2.4.1.2 Where manual inspections are conducted, the month and year the manual inspection was performed and the initials of the person performing the inspection shall be recorded.

9.6.4.2.4.1.3 Personnel making manual inspections shall keep records of all fire extinguishers inspected, including those found to require corrective action.

9.6.4.2.4.1.4 Records for manual inspection shall be kept to demonstrate that at least the last 12 monthly inspections have been performed.

9.6.4.2.4.2 Electronic Inspection Records

9.6.4.2.4.2.2 Records for electronic monitoring shall be kept to demonstrate that at least the last 12 monthly inspections have been performed.

9.6.4.2.4.2.3 For electronically monitored fire extinguishers, where the extinguisher causes a signal at a control unit when a deficiency in any of the conditions listed/approved in Section 9.6.4.2.2 occurs, record keeping shall be provided in the form of an electronic event log at the control panel.

9.6.4.3 Extinguisher Maintenance

9.6.4.3.1 Maintenance Procedures. Where required by another section of these Provisions or NFPA 10 or any approved code/standard, maintenance procedures shall include the procedures detailed in the manufacturer's service manual and a thorough examination of the basic elements of the fire extinguisher, including the following:

(1) Mechanical parts of all fire extinguishers

(2) Extinguishing agent

(3) Expelling means

(4) Physical condition

9.6.4.3.2 Annual External Examination of All Extinguishers

9.6.4.3.2.1 Physical Condition. An annual external visual examination of all fire extinguishers shall be made to detect obvious physical damage, corrosion, or nozzle blockage; to verify that the operating instructions are present, legible, and facing forward

9.6.4.3.2.2 Seals or Tamper Indicators. At the time of the maintenance, the tamper seal of a rechargeable fire extinguisher shall be removed by operating the pull pin or locking device.

9.6.4.3.2.2.1 After the applicable maintenance procedures are completed, a new listed/approved tamper seal shall be installed.

9.6.4.3.2.2.2 Seals or tamper indicators on non-rechargeable type extinguishers shall not be removed.

9.6.4.3.2.3 Boots, Foot Rings, and Attachments All removable extinguisher boots, foot rings, and attachments shall be removed to accommodate thorough annual cylinder examinations.

9.6.4.3.2.4 When subjected to temperatures at or above their listed/approved rating, stored-pressure fire extinguishers that require a 12-year hydrostatic test shall be emptied and subjected to the applicable maintenance and recharge procedures on an annual basis.

9.6.4.3.2.5 Corrective Action. When an external examination of any fire extinguisher reveals a deficiency, immediate corrective action shall be taken.

9.6.4.3.3 Annual Internal Examination of Certain Types of Extinguishers

9.6.4.3.3.1 Maintenance Intervals. Fire extinguishers shall be internally examined at intervals not exceeding those specified in Table 9.6.4.3.3.1.

Table 9.6.4.3.3.1 Maintenance Involving Internal Examination

Extinguisher Type	Internal Examination Interval (years)
Stored-pressure loaded stream and antifreeze	1
Pump tank water and pump tank calcium chloride-based	1
Dry chemical, cartridge- and cylinder-operated, with mild steel shells	1*
Dry powder, cartridge- and cylinder-operated, with mild steel shells	1*
Wetting agent	1
Stored-pressure water	5
AFFF (aqueous film-forming foam)	3†
FFFP (film-forming fluoroprotein foam)	3†
Stored-pressure dry chemical, with stainless steel shells	5
Carbon dioxide	5
Wet chemical	5
Dry chemical stored-pressure, with mild steel shells, brazed brass shells, and aluminum shells	6
Halogenated agents	6
Dry powder, stored-pressure, with mild steel shells	6

* Dry chemical and dry powder in cartridge- or cylinder-operated extinguishers are examined annually.

† The extinguishing agent in liquid charge-type AFFF and FFFP extinguishers is replaced every 3 years, and an internal examination (teardown) is normally conducted at that time.

9.6.4.3.3.2 Loaded Stream Charge. Stored-pressure types of fire extinguishers containing a loaded stream agent shall be disassembled on an annual basis and subjected to complete maintenance.

9.6.4.3.3.2.1 The loaded stream charge shall be permitted to be recovered and re-used, provided it is subjected to agent analysis in accordance with the extinguisher manufacturer's instructions.

9.6.4.3.3.2.2 When the internal maintenance procedures are performed during periodic recharging or hydrostatic testing, the 1-year requirement shall begin from that date.

9.6.4.3.3.3 Cartridge- or Cylinder- Operated Extinguishers. The extinguishing agent of cartridge- or cylinder-operated extinguishers shall be internally examined annually.

9.6.4.3.3.4 Wetting Agent Extinguishers. Wetting agent extinguishers shall be disassembled on an annual basis and subjected to complete maintenance.

9.6.4.3.3.5 Annual internal examination shall not be required for no rechargeable fire extinguishers, carbon dioxide fire extinguishers, or stored-pressure fire extinguishers, except for those types specified in Section 9.6.4.3.3.2.

9.6.4.4 Annual Maintenance Record Keeping

9.6.4.4.1 Each fire extinguisher shall have a tag or label securely attached that indicates that maintenance was performed.

9.6.4.4.1.1 The tag or label, as a minimum, shall identify the following:

(1) Month and year maintenance was performed

(2) Person performing the work

(3) Name of the agency performing the work

9.6.4.4.2 Each extinguisher that has undergone maintenance that includes internal examination, except extinguishers identified in Sections 9.6.4.3.3.3 and 9.6.4.3.3.4, shall have a verification-of-service collar located around the neck of the container.

9.6.4.4.3 Verification-of-Service Collar (Maintenance or Recharging)

9.6.4.5 Corrective Action. When maintenance of any fire extinguisher reveals a deficiency, immediate corrective action shall be taken.

9.6.4.6 Six-Year Internal Examination of Certain Types of Extinguishers. Every 6 years, stored-pressure fire extinguishers that require a 12-year hydrostatic test shall be emptied and subjected to the applicable internal and external examination procedures as detailed in the manufacturer's service manual and NFPA 10 or any approved code/standard.

9.6.4.6.1 When the applicable maintenance procedures are performed during periodic recharging or hydrostatic testing, the 6-year requirement shall begin from that date.

9.6.4.6.2 No rechargeable fire extinguishers shall not be required to have a 6-year internal examination and shall not be hydrostatically tested but shall be removed from service at a maximum interval of 12 years from the date of manufacture.

9.6.4.7 Maintenance of Wheeled Extinguisher Hoses and Regulators

9.6.4.7.1 Discharge hoses on wheeled-type fire extinguishers shall be completely uncoiled and examined for damage annually.

9.6.4.7.2 Wheeled Unit Hoses. Discharge hoses on wheeled extinguishers shall be coiled in a manner to prevent kinks and to allow rapid deployment in accordance with the manufacturer's instructions.

9.6.4.7.3 Pressure Regulators. Pressure regulators provided with wheeled-type fire extinguishers shall be tested annually for outlet static pressure and flow rate in accordance with the manufacturer's instructions.

9.6.4.7.4 Corrective Action. When maintenance of any fire extinguisher hose or pressure regulator reveals a deficiency, immediate corrective action shall be taken.

9.6.4.8 Extinguisher Recharging and Extinguishing Agents

9.6.4.8.1 General

9.6.4.8.1.1 All rechargeable-type fire extinguishers shall be recharged after any use or when the need is indicated by an inspection or servicing.

9.6.4.8.1.2 When recharging is performed, the manufacturer's service manual shall be followed.

9.6.4.8.1.3 The amount of recharge agent shall be verified by weighing.

9.6.4.8.1.3.1 For those fire extinguishers that do not have the gross weight marked on the nameplate or valve, a permanent label that indicates the gross weight shall be affixed to the cylinder.

9.6.4.8.1.3.2 The added label containing the gross weight shall be a durable material of a pressure-sensitive, self-destruct type.

9.6.4.8.1.3.3 After recharging, a leak test shall be performed on stored-pressure and self-expelling types of fire extinguishers.

9.6.4.8.1.3.4 In no case shall an extinguisher be recharged if it is beyond its specified hydrostatic test date.

9.6.4.8.2 Extinguisher Recharging Frequency for Certain Types of Extinguishers

9.6.4.8.2.1 Wetting Agent. The agent in stored-pressure wetting agent fire extinguishers shall be replaced annually.

9.6.4.8.2.2 AFFF and FFFP

9.6.4.8.2.2.1 The premixed agent in liquid charge–type AFFF and FFFP fire extinguishers shall be replaced at least once every 3 years.

9.6.4.8.2.2.2 Only the foam agent specified on the extinguisher nameplate shall be used for recharge.

9.6.4.8.2.2.3 The agent in no pressurized AFFF and FFFP fire extinguishers that is subjected to agent analysis in accordance with manufacturer's instructions shall not be required to comply with Section 9.6.4.8.2.2.1.

9.6.4.8.3 Recharge Agents

9.6.4.8.3.1 Only those agents specified on the nameplate or agents proven to have equal chemical composition, physical characteristics, and fire-extinguishing capabilities shall be used.

9.6.4.8.3.1.1 Agents listed/approved specifically for use with that fire extinguisher shall be considered to meet these requirements.

9.6.4.8.3.2 Mixing of Dry Chemicals. Multipurpose dry chemicals shall not be mixed

9.6.4.8.3.3 Topping Off

9.6.4.8.3.3.1 The remaining dry chemical in a discharged fire extinguisher shall be permitted to be re-used, provided that it is thoroughly checked by certified persons for the proper type, contamination, and condition.

9.6.4.8.3.5 Dry Powder

9.6.4.8.3.5.1 Pails or drums containing dry powder agents for scoop or shovel application for use on metal fires shall be kept full and sealed with the lid provided with the container.

9.6.4.8.3.5.2 The dry powder shall be replaced if found damp.

9.6.4.8.3.6 Removal of Moisture. For all non-water types of fire extinguishers, any moisture shall be removed before recharging.

9.6.4.8.3.7 Carbon Dioxide

9.6.4.8.3.7.1 The vapor phase of carbon dioxide shall be not less than 99.5 percent carbon dioxide.

9.6.4.8.3.7.2 The water content shall be not more than 60 parts per million (ppm) by weight at −52°F (−47°C) dew point.

9.6.4.8.3.7.3 Oil content shall not exceed 10 ppm by weight.

9.6.4.8.3.8 Water Types. The amount of liquid agent shall be determined by using one of the following:

(1) Exact measurement by weight

(2) Exact measurement in volume

(3) Anti-overfill tube, if provided

(4) Fill mark on fire extinguisher shell, if provided

9.6.4.8.3.8.1 Only the agent specified on the extinguisher nameplate shall be used for recharge.

9.6.4.8.3.8.2 Only additives identified on the original nameplate shall be permitted to be added to water type extinguishers.

9.6.4.8.3.9 Wet Chemical and Water Mist Agent Re-Use

9.6.4.8.3.9.1 Wet chemical and water mist agents shall not be re-used.

9.6.4.8.3.9.2 If a wet chemical or water mist extinguisher is partially discharged, all remaining wet chemical or water mist shall be discarded.

9.6.4.8.3.9.3 Wet chemical or water mist agent shall be discarded and replaced at the hydrostatic test interval.

(A) Only the agent specified on the extinguisher nameplate shall be used for recharge.

9.6.4.9 Prohibition on Uses of Extinguishers and Conversion of Fire Extinguisher Types
9.6.4.9.1 Fire extinguishers shall not be used for any purpose other than that of a fire extinguisher.

9.6.4.9.2 Fire extinguishers shall not be converted from one type to another, modified, or altered.

9.6.4.9.3 Fire extinguishers shall not be converted to use a different type of extinguishing agent.

9.6.4.10 Maintenance and Recharge Service Collar. Each extinguisher that has undergone maintenance that included internal examination or that has been recharged requiring the removal of the valve assembly shall have a verification-of service collar located around the neck of the container.

9.6.4.10.1 The collar shall contain a single circular piece of uninterrupted material forming a hole of a size that does not permit the collar assembly to move over the neck of the container unless the valve is completely removed.

9.6.4.10.2 The collar shall not interfere with the operation of the fire extinguisher.

9.6.4.10.3 The verification-of-service collar shall, as a minimum, identify the following:

(1) Month and year the recharging or internal examination was performed

(2) Name of the agency performing the work

9.6.4.10.4 Service Collar Exemptions

9.6.4.10.4.1 New extinguishers requiring an initial charge in the field (such as pressurized water, AFFF, FFFP, or wet chemical extinguishers) shall not be required to have a verification-of-service collar installed.

9.6.4.10.4.2 Liquefied gas, halogenated agent, and carbon dioxide extinguishers that have been recharged without valve removal shall not be required to have a verification-of-service collar installed following recharge.

9.6.4.10.4.3 Cartridge- and cylinder-operated extinguishers shall not be required to have a verification-of-service collar installed.

9.6.5 Hydrostatic Testing. For hydrostatic testing of portable fire extinguishers, refer Chapter 8 of NFPA 10 or any approved code/standard.

9.6.5.1 Condemning Extinguishers

9.6.5.1.1 Fails Test or Examination. When a fire extinguisher cylinder, shell, or cartridge fails a hydrostatic pressure test or fails to pass a visual examination, it shall be condemned and destroyed by the owner or the owner's agent.

9.6.5.1.1.1 When a cylinder is required to be condemned, the retester shall notify the owner in writing that the cylinder is condemned and that it cannot be reused.

9.6.5.1.1.2 A condemned cylinder shall not be repaired.

9.6.5.1.2 Marking Condemned Extinguishers

9.6.5.1.2.1 Condemned cylinders shall be stamped "CONDEMNED" on the top, head, shoulder, or neck with a steel stamp.

9.6.5.1.2.2 No person shall remove or obliterate the "CONDEMNED" marking.

9.6.5.1.2.3 Minimum letter height shall be 1⁄8 in. (3 mm).

9.7 Detection, Alarm, and Communications Systems

9.7.1 General

9.7.1.1 Where building fire alarm systems or automatic fire detectors are required by other sections of these Provisions, they shall be provided and installed in accordance with NFPA 70 and NFPA 72 or any approved code/standard, and Section 9.7.

9.7.1.2 Building Fire Alarm Systems. Protected premises fire alarm systems that serve the general fire alarm needs of a building or buildings shall include one or more of the following systems or functions:

(1) Manual fire alarm signal initiation

(2) Automatic fire alarm and supervisory signal initiation

(3) Monitoring of abnormal conditions in fire suppression systems

(4) Activation of fire suppression systems

(5) Activation of emergency control functions

(6) Activation of fire alarm notification appliances

(7) In-building fire emergency voice/alarm communications

(8) Guard's tour supervisory service

(9) Process monitoring supervisory systems

(10) Activation of off-premises signals

(11) Combination systems

9.7.1.3 All apparatus requiring rewinding or resetting to maintain normal operation shall be rewound or reset as promptly as possible after each test and alarm.

9.7.1.4 Impaired and Nuisance Alarm Prone Systems

9.7.1.4.1 Impaired fire alarm systems shall include, but shall not be limited to, required systems that are not fully operational, are no longer monitored as required by AHJ, or are under renovation or repair.

9.7.1.4.2 The system owner or designated representative shall immediately notify AHJ in an approved manner when a fire alarm system is impaired.

9.7.1.4.3 AHJ shall be authorized to require standby fire personnel or an approved fire watch in accordance with Section 1.7.17 at premises in which required fire alarm systems are impaired or classified as chronic nuisance alarm prone systems.

9.7.1.4.4 Fire alarm systems that have produced five or more nuisance alarms in a 365-day period shall be classified as chronic nuisance alarm prone systems.

9.7.1.4.5 AHJ shall be authorized to require central station service be provided for chronic nuisance alarm prone systems.

9.7.1.4.6 Fire alarm supervising stations and fire alarm service companies shall immediately notify AHJ-when any of the following conditions exists:

(1) A fire alarm system is impaired.

(2) Required system monitoring is no longer being provided.

(3) Required testing, service, and maintenance is no longer being provided.

(4) A fire alarm system cannot be serviced or repaired to make it fully operational.

(5) A fire alarm system cannot be serviced or repaired to eliminate chronic nuisance alarms.

9.7.1.4.7 The system owner shall replace required fire alarm systems that cannot be serviced or repaired to eliminate system impairments or chronic nuisance alarms.

9.7.1.5 Non required Coverage

9.7.1.5.1 Detection installed for reasons of achieving specific fire safety objectives, but not required by any laws, codes, or standards, shall meet all of the requirements of these Provisions.

9.7.1.5.2 Where non required detectors are installed for achieving specific fire safety objectives, additional detectors not necessary to achieve the objectives shall not be required.

9.7.1.6 Signal Initiation

9.7.1.6.1 Where required by other sections of these Provisions, actuation of the fire alarm system shall occur by any or all of the following means of initiation, but shall not be limited to such means:

(1) Manual fire alarm initiation

(2) Automatic detection

(3) Extinguishing system operation

9.7.1.6.2 Manual fire alarm boxes shall be used only for fire protective signaling purposes. Combination fire alarm and guard's tour stations shall be permitted.

9.7.1.6.3 A manual fire alarm box shall be provided as follows, unless modified by another section of these Provisions:

(1) For new alarm system installations, the manual fire alarm box shall be located within 60 in. (1525 mm) of exit doorways.

(2) For existing alarm system installations, the manual fire alarm box either shall be provided in the natural exit access path near each required exit or within 60 in. (1525 mm) of exit doorways.

9.7.1.6.4 Manual fire alarm boxes shall be mounted on both sides of grouped openings over 40 ft (12.2 m) in width, and within 60 in. (1525 mm) of each side of the opening.

9.7.1.6.5 Additional manual fire alarm boxes shall be located so that, on any given floor in any part of the building, no horizontal distance on that floor exceeding 200 ft (61 m) shall need to be traversed to reach a manual fire alarm box.

9.7.1.6.6 Manual fire alarm boxes shall be accessible, unobstructed, and visible.

9.7.1.6.7 Where a sprinkler system provides automatic detection and alarm system initiation, it shall be provided with an approved alarm initiation device that operates when the flow of water is equal to or greater than that from a single automatic sprinkler.

9.7.1.6.8 Where a total (complete) coverage smoke detection system is required by another section of these Provisions, automatic detection of smoke shall be provided in all occupiable areas in environments that are suitable for proper smoke detector operation.

9.7.1.7 Smoke Alarms

9.7.1.7.1 Where required by another section of these Provisions, single-station and multiple-station smoke alarms shall be in accordance with NFPA 72 or any approved code/standard unless otherwise provided in Sections 9.7.1.7.3, 9.7.1.7.4, 9.7.1.7.5, or 9.7.1.7.6.

9.7.1.7.2 The interconnection of smoke alarms shall apply only to new construction as provided in 9.7.1.7.8.

9.7.1.7.3 Smoke alarms and smoke detectors shall not be installed within an area of exclusion determined by a 10 ft (3.0 m) radial distance along a horizontal flow path from a stationary or fixed cooking appliance, unless listed/approved for installation in close proximity to cooking appliances. Smoke alarms and smoke detectors installed between 10 ft (3.0 m) and 20 ft (6.1 m) along a horizontal flow path from a stationary or fixed cooking appliance shall be equipped with an alarm-silencing means or use photoelectric detection.

9.7.1.7.4 Smoke alarms and smoke detectors shall not be installed within a 36 in. (910 mm) horizontal path from a door to a bathroom containing a shower or tub unless listed/approved for installation in close proximity to such locations.

9.7.1.7.5 System smoke detectors arranged to function in the same manner as single-station or multiple-station smoke alarms shall be permitted in lieu of smoke alarms.

9.7.1.7.6 Smoke alarms, other than battery-operated smoke alarms as permitted by other sections of these Provisions, shall be powered in accordance with NFPA 72 or any approved code/standard.

9.7.1.7.7 In new construction, where two or more smoke alarms are required within a dwelling unit, suite of rooms, or similar area, they shall be arranged so that operation of any smoke alarm shall cause the alarm in all smoke alarms within the dwelling unit, suite of rooms, or similar area to sound, unless otherwise permitted by the following:

(1) The requirement of Section 9.7.1.7.7 shall not apply where permitted by another section of these Provisions.

(2) The requirement of Section 9.7.1.7.7 shall not apply to configurations that provide equivalent distribution of the alarm signal.

9.7.1.7.8 The alarms described in Section 9.7.1.7.7 shall sound only within an individual dwelling unit, suite of rooms, or similar area and shall not actuate the building fire alarm system, unless otherwise permitted by AHJ.

9.7.1.7.9 Smoke alarms shall be permitted to be connected to the building fire alarm system for the purpose of annunciation in accordance with NFPA 72 or any approved code/standard.

9.7.1.8 Occupant Notification

9.7.1.8.1 Occupant notification shall be provided to alert occupants of a fire or other emergency where required by other sections of these Provisions.

9.7.1.8.2 Occupant notification shall be in accordance with Sections 9.7.1.8.3 through 9.7.1.9.2, unless otherwise provided in Sections 9.7.1.8.2.1 through 9.7.1.8.2.3.

9.7.1.8.2.1 Elevator lobby, hoistway, and associated machine room smoke detectors used solely for elevator recall, and heat detectors used solely for elevator power shutdown, shall not be required to activate the building evacuation alarm if the power supply and installation wiring to such detectors are monitored by the building fire alarm system, and if the activation of such detectors initiates a supervisory signal at a constantly attended location.

9.7.1.8.2.2 Smoke detectors used solely for closing dampers or heating, ventilating, and air-conditioning system shutdown shall not be required to activate the building evacuation alarm, provided that the power supply and installation wiring to the detectors are monitored by the building fire alarm system, and the activation of the detectors initiates a supervisory signal at a constantly attended location.

9.7.1.8.2.3 Smoke detectors located at doors for the exclusive operation of automatic door release shall not be required to activate the building evacuation alarm, provided that the power supply and installation wiring to the detectors are monitored by the building fire alarm system, and the activation of the detectors initiates a supervisory signal at a constantly attended location.

9.7.1.8.3 Unless otherwise provided in Sections 9.7.1.8.3.1 through 9.7.1.8.3.6, notification signals for occupants to evacuate shall be audible and visible signals.

9.7.1.8.3.1 Areas not subject to occupancy by persons who are hearing impaired shall not be required to comply with the provisions for visible signals.

9.7.1.8.3.2 Visible-only signals shall be provided where specifically permitted in health care occupancies.

9.7.1.8.3.3 Existing alarm systems shall not be required to comply with the provision for visible signals.

9.7.1.8.3.4 Visible signals shall not be required in exit stair enclosures.

9.7.1.8.3.5 Visible signals shall not be required in elevator cars.

9.7.1.8.3.6 Public mode visual notification appliances in accordance with NFPA 72 or any approved code/standard.

9.7.1.8.4 The general evacuation alarm signal shall operate in accordance with one of the methods prescribed by Sections 9.7.1.8.4.1 through 9.7.1.8.4.5.

9.7.1.8.4.1 The general evacuation alarm signal shall operate throughout the entire building other than the locations described in Sections 9.7.1.8.4.4 and 9.7.1.8.4.5.

9.7.1.8.4.2 Where total evacuation of occupants is impractical due to building configuration, only the occupants in the affected zones shall be initially notified, and provisions shall be made to selectively notify occupants in other zones to afford orderly evacuation of the entire building, provided that such arrangement is approved by AHJ.

9.7.1.8.4.3 Where occupants are incapable of evacuating themselves because of age, physical or mental disabilities, or physical restraint, all of the following shall apply:

(1) The private operating mode as described in NFPA 72 or any approved code/standard shall be permitted to be used.

(2) Only the attendants and other personnel required to evacuate occupants from a zone, area, floor, or building shall be required to be notified.

(3) Notification of personnel as specified in 9.7.1.8.4.3 (2) shall include means to readily identify the zone, area, floor, or building in need of evacuation.

9.7.1.8.4.4 The general evacuation signal shall not be required to operate in exit stair enclosures.

9.7.1.8.4.5 The general evacuation signal shall not be required to operate in elevator cars.

9.7.1.8.5 Audible alarm notification appliances shall be of such character and so distributed as to be effectively heard above the average ambient sound level that exists under normal conditions of occupancy.

9.7.1.8.6 Audible alarm notification appliances shall produce signals that are distinctive from audible signals used for other purposes in a given building.

9.7.1.8.7 Automatically transmitted or live voice evacuation or relocation instructions shall be permitted to be used to notify occupants and shall comply with either Sections 9.7.1.8.7.1 or 9.7.1.8.7.2.

9.7.1.8.7.1 Automatically transmitted or live voice evacuation or relocation instructions shall be in accordance with NFPA 72 or any approved code/standard.

9.7.1.8.7.2 Unless otherwise permitted by another section of these Provisions, audible and visible fire alarm notification appliances shall comply with either Sections 9.7.1.8.7.2.1 or 9.7.1.8.7.2.2.

9.7.1.8.7.2.1 Audible and visible fire alarm notification appliances shall be used only for fire alarm system or other emergency purposes.

9.7.1.8.7.2.2 Emergency voice/alarm communication systems shall be permitted to be used for other purposes.

9.7.1.9 Emergency Forces Notification

9.7.1.9.1 Where required by another section of these Provisions, emergency forces notification shall be provided to alert the municipal fire department and fire brigade (if provided) of fire or other emergency.

9.7.1.9.2 Where emergency forces notification is required by another section of these Provisions, the fire alarm system shall be arranged to transmit the alarm automatically via any of the following means acceptable to AHJ:

(1) Auxiliary fire alarm system

(2) Central station fire alarm system

(3) Proprietary supervising station fire alarm system

(4) Remote supervising station fire alarm system

9.7.1.9.3 For existing installations where none of the means of notification specified in 9.7.1.9.2 (1) through 9.7.1.9.2 (4) are available, an approved plan for notification of the municipal fire department shall be permitted.

9.7.1.9.4 For other than existing installations, where fire alarm systems are required to provide emergency forces notification, supervisory signals and trouble signals shall sound

and be visibly displayed either at an approved, remotely located receiving facility or at a location within the protected building that is constantly attended by qualified personnel.

9.7.1.10 Fire Safety Functions

9.7.1.10.1 Fire safety functions shall be installed in accordance with the requirements of NFPA 72 or any approved code/standard.

9.7.1.10.2 Where required by another section of these Provisions, the following functions shall be actuated:

(1) Release of hold-open devices for doors or other opening protective

(2) Stairwell or elevator shaft pressurization

(3) Smoke management or smoke control systems

(4) Unlocking of doors

(5) Elevator recall and shutdown

(6) HVAC shutdown

9.7.1.11 Location of Controls. Operator controls, alarm indicators, and manual communications capability shall be installed at a convenient location acceptable to AHJ.

9.7.2 Where Required and Occupancy Requirements

9.7.2.1 New Assembly Occupancies

9.7.2.1.1 New assembly occupancies with occupant loads of more than 300 and all theaters with more than one audience-viewing room shall be provided with an approved fire alarm system in accordance with Sections 9.7 and 9.7.2.1, unless otherwise permitted by Section 9.7.2.1.2.

9.7.2.1.2 New assembly occupancies that are a part of a multiple occupancy protected as a mixed occupancy shall be permitted to be served by a common fire alarm system, provided that the individual requirements of each occupancy are met.

9.7.2.1.3 In new assembly occupancies with occupant loads of more than 300, automatic detection shall be provided in all hazardous areas that are not normally occupied, unless such areas are protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.3.

9.7.2.2 Existing Assembly Occupancies. Section 9.7.2.1.1 through 9.7.2.1.3 shall be applicable.

9.7.2.3 New Educational Occupancies

9.7.2.3.1 New educational occupancies shall be provided with a fire alarm system in accordance with Sections 9.7 and 9.7.2.3.

9.7.2.3.2 The requirement of 9.7.2.3.1 shall not apply to buildings meeting all of the following criteria:

(1) Buildings having a covered area not exceeding 1000 ft^2 (93 m^2)

(2) Buildings containing four or lesser classroom

(3) Buildings located not less than 30 ft (9.1 m) from another building

9.7.2.3.3 In educational buildings exempted in 9.7.2.3.2, approved stand-alone smoke detectors shall be provided.

9.7.2.3.4 Fire alarm system shall not be permitted to be used for other emergency signaling or for class changes.

9.7.2.3.5 To prevent students from being returned to a building that is burning, the recall signal shall be separate and distinct from any other signals, and such signal shall be permitted to be given by use of distinctively colored flags or banners.

9.7.2.3.6 If the recall signal is electric, the push buttons or other controls shall be kept under lock, the key for which shall be in the possession of the principal or another designated person in order to prevent a recall at a time when there is an actual fire.

9.7.2.3.7 Carbon Monoxide Alarms and Carbon Monoxide Detection Systems

9.7.2.3.7.1 Carbon monoxide alarms or carbon monoxide detectors shall be provided in new educational occupancies in the locations specified as follows:

(1) On the ceilings of rooms containing permanently installed fuel-burning appliances

(2) Centrally located within occupiable spaces served by the first supply air register from a permanently installed, fuel burning HVAC system

(3) Centrally located within occupiable spaces adjacent to a communicating attached garage

9.7.2.3.7.2 Carbon monoxide alarms and carbon monoxide detectors shall not be required in the following locations:

(1) Garages

(2) Occupiable spaces with communicating attached garages that are open parking structures

(3) Occupiable spaces with communicating attached garages that are mechanically ventilated

9.7.2.4 Existing Educational Occupancies. Section 9.7.2.3.1 through 9.7.2.3.6 shall be applicable.

9.7.2.5 New Day-Care Occupancies

9.7.2.5.1 New day-care occupancies, other than day-care occupancies housed in one room, shall be provided with a fire alarm system in accordance with Section 9.7 and 9.7.2.5.

9.7.2.5.2 Initiation. Initiation of the required fire alarm system shall be by manual means and by operation of any required smoke detectors and required sprinkler systems.

9.7.2.5.3 Detection. A smoke detection system shall be installed in accordance with Section 9.7 in new day-care occupancies, other than those housed in one room, and such system shall comply with both of the following:

(1) Detectors shall be installed on each story in front of the doors to the stairways and in the corridors of all floors occupied by the day-care occupancy.

(2) Detectors shall be installed in lounges, recreation areas, and sleeping rooms in the day-care occupancy.

9.7.2.6 Existing Day-Care Occupancies. Section 9.7.2.5.1 through 9.7.2.5.3 shall be applicable.

9.7.2.7 New Health Care Occupancies

9.7.2.7.1 New health care occupancies shall be provided with a fire alarm system in accordance with Section 9.7 and 9.7.2.7.

9.7.2.7.2 Initiation of the required fire alarm systems shall be by manual means, by means of any required sprinkler system, detection devices, or detection systems.

9.7.2.7.3 Manual fire alarm boxes in patient sleeping areas shall not be required at exits if located at all nurses' control stations or other continuously attended staff location.

9.7.2.7.4 Nursing Homes. An approved automatic smoke detection system shall be installed in corridors throughout smoke compartments containing patient sleeping rooms and in spaces open to corridors, unless otherwise permitted by one of the following:

(1) Corridor systems shall not be required where each patient sleeping room is protected by an approved smoke detection system.

(2) Corridor systems shall not be required where patient room doors are equipped with automatic door-closing devices with integral smoke detectors on the room side installed, provided that the integral detectors provide occupant notification.

9.7.2.8 Existing Health Care Occupancies. Section 9.7.2.7.1 through 9.7.2.7.4 shall be applicable.

9.7.2.9 New Detention and Correctional Occupancies

9.7.2.9.1 General. New detention and correctional occupancies shall be provided with a fire alarm system in accordance with Section 9.7 and 9.7.2.9.

9.7.2.9.2 Initiation. Initiation of the required fire alarm system shall be by manual means, by means of any required detection devices or detection systems, and by means of water flow alarm in the sprinkler system, unless otherwise permitted by the following:

(1) Manual fire alarm boxes shall be permitted to be locked, provided that staff is present within the area when it is occupied and staff has keys readily available to unlock the boxes.

(2) Manual fire alarm boxes shall be permitted to be located in a staff location, provided that both of the following criteria are met:

(a) The staff location is attended when the building is occupied.

(b) The staff attendant has direct supervision of the sleeping area.

9.7.2.9.3 Detection. An approved automatic smoke detection system shall be in accordance with Section 9.7, and shall be provided throughout all resident sleeping areas and adjacent day rooms, activity rooms, or contiguous common spaces.

9.7.2.9.3.1 Smoke detectors shall not be required in sleeping rooms with four or fewer occupants. **9.7.2.9.3.2** Smoke detectors shall not be required in Use Condition II open dormitories where staff is present within the dormitory whenever the dormitory is occupied.

9.7.2.10 Existing Detention and Correctional Occupancies. Section 9.7.2.9.1 through 9.7.2.9.3 shall be applicable.

9.7.2.11 New and Existing One- and Two-Family Dwellings

9.7.2.11.1 New and existing dwelling units should be protected by stand-alone smoke detectors.

9.7.2.11.2 Smoke detectors should be installed in all of the following locations:

(1) All sleeping rooms

(2) Outside of each separate sleeping area, in the immediate vicinity of the sleeping rooms

(3) On each level of the dwelling unit, including basements

9.7.2.12 New and Existing Lodging or Rooming Houses

9.7.2.12.1 New and existing lodging or rooming houses, other than those meeting 9.7.2.12.2, shall be provided with a fire alarm system in accordance with Section 9.7.

9.7.2.12.2 A fire alarm system in accordance with Section 9.7 shall not be required in existing lodging or rooming houses that have an existing smoke detection system, and where detection system includes not less than one manual fire alarm box per floor arranged to initiate the smoke detection alarm.

9.7.2.12.3 Smoke Alarms

9.7.2.12.3.1 Approved smoke alarms, other than existing smoke alarms, shall be installed in every sleeping room.

9.7.2.12.3.2 In other than existing buildings, the smoke alarms shall be interconnected.

9.7.2.12.3.3 Existing battery-powered smoke alarms shall be permitted where the facility has demonstrated that the testing, maintenance, and battery replacement programs will ensure reliability of power to the smoke alarms.

9.7.2.13 New Hotels and Dormitories

9.7.2.13.1 A fire alarm system in accordance with Section 9.7, except as modified by 9.7.2.13.2 through 9.7.2.13.6, shall be provided.

9.7.2.12.2 Initiation. The required fire alarm system shall be initiated by each of the following:

(1) Manual means in accordance with 9.7.1.7

(2) Manual fire alarm box located at the hotel desk or other convenient central control point under continuous supervision by responsible employees

(3) Required automatic sprinkler system

(4) Required automatic detection system other than sleeping room smoke detectors

9.7.2.13.3 Notification

9.7.2.13.3.1 In occupiable areas, other than guest rooms and guest suites, visible notification appliances shall be provided.

9.7.2.13.3.2 Guest rooms and guest suites specifically required and equipped to accommodate hearing-impaired individuals shall be provided with a visible notification appliance.

9.7.2.13.4 Annunciation and annunciation zoning shall be provided in buildings three or more stories in height or having more than 50 guest rooms or guest suites. Annunciation shall be provided at a location readily accessible from the primary point of entry for emergency response personnel.

9.7.2.13.5 Detection. A corridor smoke detection system in accordance with Section 9.7 shall be provided in buildings other than those protected throughout by an approved, supervised automatic sprinkler system.

9.7.2.13.6 Smoke Alarms. Smoke alarms shall be installed in every guest room and every living area and sleeping room within a guest suite.

9.7.2.13.7 Carbon Monoxide Alarms and Carbon Monoxide Detection Systems

9.7.2.13.7.1 Carbon monoxide alarms or carbon monoxide detectors shall be provided in new hotels and dormitories where either of the following conditions exists:

(1) Guest rooms or guest suites with communicating attached garages, unless otherwise exempted elsewhere in these Provisions.

(2) Guest rooms or guest suites containing a permanently installed fuel-burning appliance or fuel-burning fireplace.

9.7.2.13.7.2 Where required, carbon monoxide alarms or carbon monoxide detectors shall be installed in the following locations:

(1) Outside of each separate guest room or guest suite sleeping area in the immediate vicinity of the sleeping rooms

(2) On every occupiable level of a guest room and guest suite.

9.7.2.13.7.3 Carbon monoxide alarms and carbon monoxide detectors shall not be required in the following locations:

(1) In garages

(2) Within guest rooms or guest suites with communicating attached garages that are mechanically ventilated

9.7.2.14 Existing Hotels and Dormitories. Section 9.7.2.13.1 through 9.7.2.13.6 shall be applicable.

9.7.2.15 New Apartment Buildings

9.7.2.15.1 New apartment buildings four or more stories in height or with more than 10 dwelling units, shall be provided with a fire alarm system in accordance with Section 9.7.

9.7.2.15.2 A fire alarm system shall not be required in buildings where each dwelling unit is separated from other contiguous dwelling units by fire barriers (see Section 8.6) having a minimum 1-hour fire resistance rating, and where each dwelling unit has either its own independent exit or its own independent stairway or ramp discharging at the finished ground level.

9.7.2.15.3 Smoke Alarms. Smoke alarms shall be installed in accordance with Section 9.7.1.7 in every sleeping area, outside every sleeping area in the immediate vicinity of the bedrooms, and on all levels of the dwelling unit, including basements.

9.7.2.16 Existing Apartment Buildings. Section 9.7.2.15.1 through 9.7.2.15.3 shall be applicable. In addition, following shall be permitted:

9.7.2.16.1 Smoke alarms required by Section 9.7.2.15.3 shall be permitted to be battery powered.

9.7.2.16.2 Smoke alarms required by Section 9.7.2.15.3 shall not be required to be provided with a secondary (standby) power source.

9.7.2.17 New Small (Not More Than 16 Residents) Residential Board and Care Occupancies

9.7.2.17.1 General. A manual fire alarm system shall be provided in accordance with Section 9.7.

9.7.2.17.2 Occupant Notification. Occupant notification shall be provided automatically, without delay.

9.7.2.17.3 Smoke Alarms

9.7.2.17.3.1 Approved smoke alarms shall be provided.

9.7.2.17.3.2 Smoke alarms shall be installed on all levels, including basements but excluding crawl spaces and unfinished attics.

9.7.2.17.3.3 Smoke alarms shall be installed in all living areas and sleeping rooms.

9.7.2.17.3.4 Smoke alarms shall be powered from the building electrical system and, when activated, shall initiate an alarm that is audible in all sleeping areas.

9.7.2.18 Existing Small (Not More Than 16 Residents) Residential Board and Care Occupancies. Provision of 9.7.2.18 shall apply except as modified in 9.7.2.19.1.

9.7.2.18.1 In existing buildings, other manually activated continuously sounding alarms acceptable to AHJ shall be permitted in lieu of a fire alarm system.

9.7.2.19 New Large (More than 16 Residents) Residential Board and Care Occupancies

9.7.2.19.1 A fire alarm system shall be provided in accordance with Section 9.7.

9.7.2.19.2 Smoke Alarms. Approved smoke alarms shall be installed in accordance with Section 9.7.1.7 inside every sleeping room, outside every sleeping area in the immediate vicinity of the bedrooms, and on all levels within a resident unit.

9.7.2.19.3 Smoke Detection Systems

9.7.2.19.3.1 Corridors and spaces open to the corridors, shall be provided with smoke detectors that comply with the codes/standards acceptable to AHJ, and are arranged to initiate an alarm that is audible in all sleeping areas.

9.7.2.19.3.2 Smoke detection systems shall not be required in unenclosed corridors, passageways, balconies, colonnades, or other arrangements with one or more sides along the long dimension fully or extensively open to the exterior at all times.

9.7.2.20 Existing Large (More Than 16 Residents) Residential Board and Care Occupancies.

9.7.2.20.1 General. A fire alarm system in accordance with Section 9.7 shall be provided, unless all of the following conditions are met:

(1) The facility has an evacuation capability of prompt or slow.

(2) Each sleeping room has exterior exit access.

(3) The building does not exceed three stories in height.

9.7.2.20.2 Smoke Alarms. Smoke alarms shall be provided in accordance with Section 9.7.1.7. **9.7.2.20.2.1** Each sleeping room shall be provided with an approved smoke alarm in accordance with Section 9.7.1.7 that is powered from the building electrical system.

9.7.2.20.2.2 Existing battery-powered smoke alarms, rather than building electrical service–powered smoke alarms, shall be accepted where, in the opinion of AHJ, the facility has demonstrated that testing, maintenance, and battery replacement programs ensure the reliability of power to the smoke alarms.

9.7.2.20.2.3 Sleeping room smoke alarms shall not be required in facilities having an existing corridor smoke detection system that complies with Section 9.7 and is connected to the building fire alarm system.

9.7.2.20.3 Smoke Detection Systems

9.7.2.20.3.1 All living areas and all corridors shall be provided with smoke detectors that comply with the standard acceptable to AHJ, and are arranged to initiate an alarm that is audible in all sleeping areas.

9.7.2.20.3.2 Smoke detection systems shall not be required in living areas of buildings having a prompt or slow evacuation capability protected throughout by an approved automatic sprinkler system installed in accordance with Section 9.3.

9.7.2.20.3.3 Smoke detection systems shall not be required in unenclosed corridors, passageways, balconies, colonnades, or other arrangements with one or more sides along the long dimension fully or extensively open to the exterior at all times.

9.7.2.21 New Mercantile Occupancies. New Class A mercantile occupancies shall be provided with a fire alarm system and fire detection system in accordance with Section 9.7.

9.7.2.22 Existing Mercantile Occupancies. Existing Class A mercantile occupancies shall be provided with a fire alarm system and fire detection system in accordance with Section 9.7.

9.7.2.23 New Business Occupancies. A fire alarm system and fire detection system in accordance with Section 9.7 shall be provided in all new business occupancies where any one of the following conditions exists:

(1) The building is three or more stories in height.

(2) The occupancy is subject to 50 or more occupants above or below the level of exit discharge.

(3) The occupancy is subject to 300 or more total occupants.

9.7.2.24 Existing Business Occupancies. A fire alarm system and fire detection system in accordance with Section 9.7 shall be provided in all existing business occupancies where any one of the following conditions exists:

(1) The building is three or more stories in height.

(2) The occupancy is subject to 100 or more occupants above or below the level of exit discharge.

(3) The occupancy is subject to 1000 or more total occupants.

9.7.2.25 New and Existing Industrial Occupancies. A fire alarm system and fire detection system shall be required in accordance with Section 9.7 for new and existing industrial occupancies, unless the total occupant load of the building is under 100 persons and unless, of these, fewer than 25 persons are above or below the level of exit discharge.

9.7.2.26 New and Existing Storage Occupancies

9.7.2.26.1 General. A fire alarm system shall be required in accordance with Section 9.7 for new and existing storage occupancies, except as modified by Sections 9.7.2.26.1.1, 9.7.2.26.1.2 and 9.7.2.26.1.3.

9.7.2.26.1.1 Storage occupancies limited to low hazard contents shall not be required to have a fire alarm system.

9.7.2.26.1.2 Storage occupancies with ordinary or high hazard contents not exceeding an aggregate floor area of 100,000 ft^2 (9300 m^2) shall not be required to have a fire alarm system.

9.7.2.26.1.3 Storage occupancies protected throughout by an approved automatic sprinkler system in accordance with Section 9.3 shall not be required to have a fire alarm system.

9.7.2.27 New and Existing High-Rise Buildings. A fire alarm system using an approved emergency voice/alarm communication system and fire detection system shall be installed in accordance with Section 9.7.

9.7.3 Fire Alarm Systems

9.7.3.1 General

9.7.3.1.1 Equipment

9.7.3.1.1.1 Equipment constructed and installed in conformity with these Provisions shall be listed/approved for the purpose for which it is used.

9.7.3.1.1.2 System components shall be installed, tested, inspected, and maintained in accordance with the manufacturer's published instructions and these Provisions.

9.7.3.1.1.3 All devices and appliances that receive their power from the initiating device circuit or signaling line circuit of a control unit shall be listed/approved for use with the control unit.

9.7.3.1.1.4 All apparatus requiring rewinding or resetting to maintain normal operation shall be restored to normal as promptly as possible after each abnormal condition and maintained in normal condition for operation.

9.7.3.1.1.5 Equipment shall be designed so that it is capable of performing its intended functions under the following conditions:

(1) At 85 percent and at 110 percent of the nameplate primary (main) and secondary (standby) input voltage(s)

(2) At ambient temperatures of 0°C (32°F) and 49°C (120°F)

(3) At a relative humidity of 85 percent and an ambient temperature of 30°C (86°F)

9.7.3.2 Documentation

9.7.3.2.1 Record Drawings (As-Built)

9.7.3.2.1.1 Record drawings shall consist of current updated and shop drawings reflecting the actual installation of all system equipment, components, and wiring.

9.7.3.2.1.2 A sequence of operations in input/output matrix or narrative form shall be provided with the record drawings to reflect actual programming at the time of completion.

9.7.3.2.1.3 Where necessary, revised calculations shall be provided depicting any changes due to installation conditions.

9.7.3.2.1.4 Record drawings shall be turned over to the owner with a copy placed inside the documentation cabinet in accordance with the relevant standard which can be decided by CA

9.7.3.2.1.5 Record drawings shall include approval documentation resulting from variances, performance-based designs, risk analyses, and other system evaluations or variations.

9.7.3.2.2 Record of Completion

9.7.3.2.2.1 The record of completion shall be documented in accordance with Section 9.7.3.2.2 using either the record of completion forms (Appendix A) or alternative approved documents.

9.7.3.2.2.2 The record of completion documentation shall be completed by the installing contractor and submitted to the enforcing authority and the owner at the conclusion of the job. When more than one contractor has been responsible for the installation, each contractor shall complete the portions of the documentation for which that contractor has responsibility.

9.7.3.2.2.3 The preparation of the record of completion documentation shall be the responsibility of the qualified and experienced person.

9.7.3.2.2.4 The record of completion documentation shall be updated to reflect all system additions or modifications and maintained in a current condition at all times.

9.7.3.2.2.5 The updated copy of the record of completion documents shall be maintained in a documentation cabinet.

9.7.3.3 Manually Actuated Alarm-Initiating Devices

9.7.3.3.1 Manually actuated alarm-initiating devices for initiating signals other than for fire alarm shall be permitted if the devices are differentiated from manual for fire alarm boxes by a color other than red and labeling.

9.7.3.3.2 Combination manual fire alarm boxes and guard's signaling stations shall be permitted.

9.7.3.3.3 Manually actuated alarm-initiating devices shall be securely mounted.

9.7.3.3.4 Manually actuated alarm-initiating devices shall be mounted on a background of contrasting color.

9.7.3.3.5 The operable part of a manually actuated alarm initiating device shall be not less than 42 in. (1.07 m) and not more than 48 in. (1.22 m) from the finished floor.

9.7.3.3.6 Manually actuated alarm-initiating devices shall be permitted to be single action or double action.

9.7.3.3.7 Listed/approved protective covers shall be permitted to be installed over single- or double-action manually actuated alarm-initiating devices.

9.7.3.3.8 Manual fire alarm boxes shall comply with Sections 9.7.3.3.8.1 through 9.7.3.3.8.6.

9.7.3.3.8.1 Manual fire alarm boxes shall be used only for fire alarm initiating purposes.

9.7.3.3.8.2 Manual fire alarm boxes shall be installed so that they are conspicuous, unobstructed, and accessible.

9.7.3.3.8.3 Unless installed in an environment that precludes the use of red paint or red plastic, manual fire alarm boxes shall be red in color.

9.7.3.3.8.4 Manual fire alarm boxes shall be located within 5 ft (1.5 m) of each exit doorway on each floor.

9.7.3.3.8.5 Additional manual fire alarm boxes shall be provided so that the travel distance to the nearest manual fire alarm box will not exceed 200 ft (61 m), measured horizontally on the same floor.

9.7.3.3.8.6 Manual fire alarm boxes shall be mounted on both sides of grouped openings over 40 ft (12.2 m) in width, and within 5 ft (1.5 m) of each side of the grouped opening.

9.7.3.3.9 When fire alarm systems are not monitored, an approved permanent sign shall be installed adjacent to each manual fire alarm box. The sign shall read as follows:

Local alarm only:

(1) Activate alarm

(2) Exit building

(3) Call fire department

9.7.3.4 Indication of Central Station Service. The prime contractor shall conspicuously indicate that the alarm system providing service at a protected premises complies with all the requirements of these Provisions through the use of a systematic follow-up program under the control of the organization that has listed/approved the prime contractor.

9.7.3.4.1 Documentation indicating Code compliance of the alarm system shall be issued by the organization that has listed/approved the prime contractor.

9.7.3.4.2 The documentation shall include, at a minimum, the following information:

(1) Name of the prime contractor involved with the ongoing Code compliance of the central station service

(2) Full description of the alarm system as installed

(3) Issue and expiration dates of the documentation

(4) Name, address, and contact information of the organization issuing the document

(5) Identification of AHJ for the central station service installation

9.7.3.4.3 The documentation shall be physically posted within 3 ft (1 m) of the control unit, and copies of the documentation shall be made available to upon request.

9.7.3.4.4 A central repository of issued documentation, accessible to AHJ, shall be maintained by the organization that has listed/approved the prime contractor.

9.7.3.5 Automatic Fire Detection and Alarm Service

9.7.3.5.1 Automatic fire detectors shall be located, maintained, and tested in accordance with NFPA 22 or any approved code/standard.

9.7.4 Automatic Fire Detectors

9.7.4.1 General Requirements

9.7.4.1.1 The requirements of 9.7.4.1.1 through 9.7.4.1.5 shall apply to all initiating devices.

9.7.4.1.2 Where subject to mechanical damage, an initiating device shall be protected. A mechanical guard used to protect a smoke, heat, or radiant energy–sensing detector shall be listed/approved for use with the detector.

9.7.4.1.3 Initiating devices shall be supported independently of their attachment to the circuit conductors.

9.7.4.1.4 Initiating devices shall be installed in a manner that provides accessibility for periodic inspection, testing, and maintenance.

9.7.4.1.5 Initiating devices shall be installed in all areas, compartments, or locations where required by other governing laws, codes, or standards.

9.7.4.1.6 Duct Detector Installation

9.7.4.1.6.1 Smoke detectors shall be installed, tested, and maintained in accordance with NFPA 72 or any approved code/standard.

9.7.4.1.6.2.1 Smoke detectors used solely for closing dampers or for heating, ventilating, and air-conditioning system shutdown shall not be required to activate the building evacuation alarm.

9.7.4.1.6.3 Where smoke detectors are installed in a building not equipped with an approved fire alarm system, the following shall occur:

(1) Smoke detector activation hall cause a visual and audible signal in a normally occupied area

(2) Smoke detector trouble conditions shall be indicated visually or audibly in a normally occupied area and shall be identified as air duct detector trouble

9.7.4.1.6.4 Smoke detectors powered separately from the fire alarm system for the sole function of stopping fans shall not require standby power

9.7.4.2 Requirements for Smoke and Heat Detectors

9.7.4.2.1 Recessed Mounting. Unless tested and listed/approved for recessed mounting, detectors shall not be recessed into the mounting surface.

9.7.4.3 Location

9.7.4.3.1 Unless otherwise modified, spot-type heat-sensing fire detectors shall be located on the ceiling not less than 4 in. (100 mm) from the sidewall or on the sidewalls between 4 in. and 12 in. (100 mm and 300 mm) from the ceiling.

9.7.4.3.2 Unless otherwise modified, line-type heat detectors shall be located on the ceiling or on the sidewalls not more than 20 in. (510 mm) from the ceiling.

9.7.4.3.3 Spot-Type Smoke Detectors

9.7.4.3.3.1 Spot-type smoke detectors shall be located on the ceiling or, if on a sidewall, between the ceiling and 12 in. (300 mm) down from the ceiling to the top of the detector.

9.7.4.3.3.2 To minimize dust contamination, smoke detectors, where installed under raised floors, shall be mounted only in an orientation for which they have been listed/approved.

9.7.4.3.3.3 On smooth ceilings, spacing for spot-type smoke detectors shall be in accordance with Sections 9.7.4.3.3.3.1 and 9.7.4.3.3.3.2.

9.7.4.3.3.3.1 In all cases, the manufacturer's published instructions shall be followed.

9.7.4.3.3.3.2 Other spacing shall be permitted to be used depending on ceiling height, different conditions, or response requirements.

9.7.4.3.3.4 For solid joist and beam construction, spacing for spot-type smoke detectors shall be in accordance with 9.7.4.3.3.4.1 through 9.7.4.3.3.4.5.

9.7.4.3.3.4.1 Solid joists shall be considered equivalent to beams for smoke detector spacing guidelines.

9.7.4.3.3.4.2 For level ceilings, the following shall apply:

(1) For ceilings with beam depths of less than 10 percent of the ceiling height (0.1 *H*), smooth ceiling spacing shall be permitted. Spot-type smoke detectors shall be permitted to be located on ceilings or on the bottom of beams.

(2) For ceilings with beam depths equal to or greater than 10 percent of the ceiling height (0.1 *H*), the following shall apply:

(a) Where beam spacing is equal to or greater than 40 percent of the ceiling height (0.4 *H*), spot-type detectors shall be located on the ceiling in each beam pocket.

(b) Where beam spacing is less than 40 percent of the ceiling height (0.4 *H*), the following shall be permitted for spot detectors:

i) Smooth ceiling spacing in the direction parallel to the beams and at one-half smooth ceiling spacing in the direction perpendicular to the beams

ii) Location of detectors either on the ceiling or on the bottom of the beams

(3) For beam pockets formed by intersecting beams, including waffle or pan-type ceilings, the following shall apply:

(a) For beam depths less than 10 percent of the ceiling height (0.1 *H*), spacing shall be in accordance with 9.7.4.3.3.4.2(1).

(b) For beam depths greater than or equal to 10 percent of the ceiling height (0.1 *H*), spacing shall be in accordance with 9.7.4.3.3.4.2(2).

(4) For corridors 15 ft (4.6 m) in width or less having ceiling beams or solid joists perpendicular to the corridor length, the following shall apply:

(a) Smooth ceiling spacing shall be permitted.

(b) Location of spot-type smoke detectors on ceilings, sidewalls, or the bottom of beams or solid joists

(5) For rooms of 900 ft^2 (84 m^2) or less, the following shall be permitted:

(a) Use of smooth ceiling spacing

(b) Location of spot-type smoke detectors on ceilings or on the bottom of beams

9.7.4.3.3.4.3 For sloping ceilings with beams running parallel up slope, the following shall apply:

(1) Spot-type detector(s) shall be located on the ceiling within beam pocket(s).

(2) The ceiling height shall be taken as the average height over slope.

(3) Spacing shall be measured along a horizontal projection of the ceiling.

(4) Smooth ceiling spacing shall be permitted within beam pocket(s) parallel to the beams.

(5) For beam depths less than or equal to 10 percent of the ceiling height (0.1 *H*), spot-type detectors shall be located with smooth ceiling spacing perpendicular to the beams.

(6) For beam depths greater than 10 percent of the ceiling height (0.1 *H*), the following shall apply for spacing perpendicular to the beams:

(a) For beam spacing greater than or equal to 40 percent of the ceiling height (0.4 *H*), spot-type detectors shall be located in each beam pocket.

(b) For beam spacing less than 40 percent of the ceiling height (0.4 *H*), spot-type detectors shall not be required in every beam pocket but shall be spaced not greater than 50 percent of smooth ceiling spacing.

9.7.4.3.3.4.4 For sloping ceilings with beams running perpendicular across slope, the following shall apply:

(1) Spot-type detector(s) shall be located at the bottom of the beams.

(2) The ceiling height shall be taken as the average height over slope.

(3) Spacing shall be measured along a horizontal projection of the ceiling.

(4) Smooth ceiling spacing shall be permitted within beam pocket(s).

(5) For beam depths less than or equal to 10 percent of the ceiling height (0.1 *H*), spot-type detectors shall be located with smooth ceiling spacing.

(6) For beam depths greater than 10 percent of the ceiling height (0.1 *H*), spot-type detectors shall not be required to be located closer than (0.4 *H*) and shall not exceed 50 percent of smooth ceiling spacing.

9.7.4.3.3.4.5 For sloped ceilings with beam pockets formed by intersecting beams, the following shall apply:

(1) Spot-type detector(s) shall be located at the bottom of the beams.

(2) The ceiling height shall be taken as the average height over slope.

(3) Spacing shall be measured along a horizontal projection of the ceiling.

(4) For beam depths less than or equal to 10 percent of the ceiling height (0.1 *H*), spot-type detectors shall be spaced with not more than three beams between detectors and shall not exceed smooth ceiling spacing.

(5) For beam depths greater than 10 percent of the ceiling height (0.1 *H*), spot-type detectors shall be placed with not more than two beams between detectors, but shall not be required to be spaced closer than (0.4 *H*), and shall not exceed 50 percent of smooth ceiling spacing.

9.7.4.3.3.4.6 For sloped ceilings with solid joists, the detectors shall be located on the bottom of the joist.

9.7.4.3.4 Protection During Construction

9.7.4.3.4.1 Where detectors are installed for signal initiation during construction, they shall be cleaned and verified to be operating in accordance with the listed/approved sensitivity, or they shall be replaced prior to the final commissioning of the system.

9.7.4.3.4.2 Where detectors are installed but not operational during construction, they shall be protected from construction debris, dust, dirt, and damage in accordance with the manufacturer's recommendations and verified to be operating in accordance with the listed/approved sensitivity, or they shall be replaced prior to the final commissioning of the system.

9.7.4.3.4.3 Where detection is not required during construction, detectors shall not be installed until after all other construction trades have completed cleanup.

9.7.4.3.5 Ceiling Tiles and Ceiling Assemblies. Where automatic detectors are installed, ceilings necessary for the proper actuation of the fire protection device.

9.7.4.3.6 High Air Movement Areas

9.7.4.3.6.1 Spacing

9.7.4.3.6.1.1 Smoke detector spacing shall be reduced where the airflow in a defined space exceeds 8 minutes per air change (total space volume) (equal to 7.5 air changes per hour).

9.7.4.4 Inspection, Testing, and Maintenance. The inspection, testing, and maintenance for fire alarm and fire detection systems shall be in accordance with the relevant standard which can be decided by AHJ.

9.7.4.5 Heat Detectors

9.7.4.5.1 Fixed-Temperature, Nonrestorable Line Type. Heat test shall not be performed. Functionality shall be tested mechanically and electrically. Loop resistance shall be measured and recorded. Changes from acceptance test shall be investigated.

9.7.4.5.2 Nonrestorable (General). Heat tests shall not be performed. Functionality shall be tested mechanically and electrically.

9.7.4.6 Smoke Detectors

9.7.4.6.1 In Other Than One- and Two-Family Dwellings, System Detectors. Smoke detectors shall be tested in place to ensure smoke entry into the sensing chamber and an alarm response. Testing with smoke or listed/approved and labeled product, acceptable to the manufacturer or in accordance with their published instructions, shall be permitted as acceptable test methods. Other methods listed/approved in the manufacturer's published

instructions that ensure smoke entry from the protected area, through the vents, into the sensing chamber shall be permitted. Any of the following tests shall be performed to ensure that each smoke detector is within its listed/approved and marked sensitivity range:

(1) Calibrated test method

(2) Manufacturer's calibrated sensitivity test instrument

(3) Listed/approved control equipment arranged for the purpose

(4) Smoke detector/control unit arrangement whereby the detector causes a signal at the control unit when its sensitivity is outside its listed/approved sensitivity range

(5) Other calibrated sensitivity test method approved by AHJ

9.7.4.6.2 Projected Beam Type. The detector shall be tested by introducing smoke, other aerosol, or an optical filter into the beam path.

9.7.4.6.3 A functional test shall be performed on all smoke detectors upon initial installation and at least annually.

9.7.4.7 In other than one- and two-family dwellings, sensitivity of smoke detectors shall be tested in accordance with 9.7.4.7.1 through 9.7.4.7.7.

9.7.4.7.1 Sensitivity shall be checked within 1 year after installation.

9.7.4.7.2 Sensitivity shall be checked every alternate year thereafter unless otherwise permitted by compliance with 9.7.4.7.3.

9.7.4.7.3 After the second required calibration test, if sensitivity tests indicate that the device has remained within its listed/approved 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 a maximum of 5 years.

9.7.4.7.3.1 If the frequency is extended, records of nuisance alarms and subsequent trends of these alarms shall be maintained.

9.7.4.7.3.2 In zones or in areas where nuisance alarms show any increase over the previous year, calibration tests shall be performed.

9.7.4.7.4 To ensure that each smoke detector is within its listed/approved and marked sensitivity range, it shall be tested using any of the following methods:

(1) Calibrated test method

(2) Manufacturer's calibrated sensitivity test instrument

(3) Listed/approved control equipment arranged for the purpose

(4) Smoke detector/fire alarm control unit arrangement whereby the detector causes a signal at the fire alarm control unit where its sensitivity is outside its listed/approved sensitivity range

(5) Other calibrated sensitivity test methods approved by AHJ

9.7.4.7.5 Unless otherwise permitted by 9.7.4.7.6, smoke detectors found to have a sensitivity outside the listed/approved and marked sensitivity range shall be cleaned and recalibrated or be replaced.

9.7.4.7.6 Smoke detectors listed/approved as field adjustable shall be permitted to either be adjusted within the listed/approved and marked sensitivity range, cleaned, and recalibrated, or be replaced.

9.7.4.7.7 The detector sensitivity shall not be tested or measured using any device that administers an unmeasured concentration of smoke or other aerosol into the detector or smoke alarm.

9.8 Non-Listed/Non-approved Fire Protection or Suppression Devices and Equipment

9.8.1 It shall be unlawful to market, sell, advertise, or distribute any device or equipment as suitable for fire protection or fire suppression purposes unless the device or equipment is listed/approved for such purpose by an internationally recognized testing laboratory or as otherwise permitted by 9.8.2.

9.8.2 The requirements of 9.8.1 shall not apply where, adopted standards, or the adopted code allows the use of non-listed/non-approved fire protection or suppression equipment.

Chapter 10 Means of Egress

10.1 Application. Means of egress in new and existing buildings shall comply with these Provisions and referenced sections of NFPA 101 or any approved code/standard.

10.2 Definitions

10.2.1 Means of Egress. A continuous and unobstructed way of travel from any point in a building or structure to a public way consisting of three separate and distinct parts: (1) the exit access, (2) the exit, and (3) the exit discharge.

10.2.1.1 Exit Access. That portion of a means of egress, such as corridors, hallways, passageways, portions of intervening room, doors, elevators, balconies, lobbies and ramps, that leads to an exit.

10.2.1.2 Exit. That portion of a means of egress that is separated from all other spaces of a building or structure by construction, location, or equipment is required to provide a protected way of travel to the exit discharge.

10.2.1.3 Exit Discharge. That portion of a means of egress between the termination of an exit and a public way.

10.3 Separation of Means of Egress

10.3.1 Exit Access Corridors. Corridors used as exit access and serving an area having an occupant load exceeding 30 shall be separated from other parts of the building by walls having not less than a 1-hour fire resistance rating in accordance with Section 8.6 unless otherwise permitted by the following:

(1) This requirement shall not apply to existing buildings, provided that the occupancy classification does not change.

(2) This requirement shall not apply where otherwise relaxed in these Provisions for certain occupancies.

10.3.2 Exit Enclosure

10.3.2.1 Where these Provisions require an exit to be separated from other parts of the building, the separating construction shall meet the requirements of Section 8.6 and the following:

(1) The separation shall have a minimum 1-hour fire resistance rating where the exit connects three or fewer stories.

(2) The separation shall have a minimum 2-hour fire resistance rating where the exit connects four or more stories, unless one of the following conditions exists:

(a) In existing non-high-rise buildings, existing exit stair enclosures shall have a minimum 1-hour fire resistance rating.

(b) In existing buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.3, existing exit stair enclosures shall have a minimum 1-hour fire resistance rating.

(3) Openings in the separation shall be protected by fire door assemblies equipped with door closers.

(4) Penetrations into, and openings through, an exit enclosure assembly shall be limited to the following:

(a) Fire doors with self-closer.

(b) Electrical conduits serving the stairway.

(c) Required exit doors.

(d) Ductwork and equipment necessary for independent stair pressurization.

(e) Sprinkler piping.

(f) Standpipes.

(g) Existing penetrations protected in accordance with Section 8.6.5.

(h) Penetrations for fire alarm circuits, where the circuits are installed in metal conduit.

(5) Penetrations or communicating openings shall be prohibited between adjacent exit enclosures.

(6) Membrane penetrations shall be permitted on the exit access side of the exit enclosure and shall be protected.

10.3.2.2 An exit enclosure shall provide a continuous protected path of travel to an exit discharge.

10.3.2.3 An exit enclosure shall not be used for any purpose that has the potential to interfere with its use as an exit and, if so designated, as an area of refuge.

10.4 Interior Wall, Ceiling and Floor Finish in Exit Enclosures

10.4.1 In exit enclosures, interior wall and ceiling finish materials complying with Section 8.4.4 shall be Class A or Class B.

10.4.2 New interior floor finish in exit enclosures, including stair treads and risers, shall be not less than Class II in accordance with Section 8.4.4.

10.4.3 Existing interior floor finish in exit enclosures, including stair treads and risers, shall be permitted to remain in use unless it presents a severe fire hazard.

10.5 Headroom

10.5.1 Means of egress shall be designed and maintained to provide headroom not less than 7 ft 6 in. (2285 mm), with projections from the ceiling not less than 6 ft 8 in. (2030 mm) above the finished floor.

10.5.2 Headroom on stairs shall be not less than 6 ft 8 in. (2030 mm) and shall be measured vertically above a plane parallel to, and tangent with, the most forward projection of the stair tread.

10.5.3 Measurement of headroom clearance shall be in accordance with Figure 10.5.3.

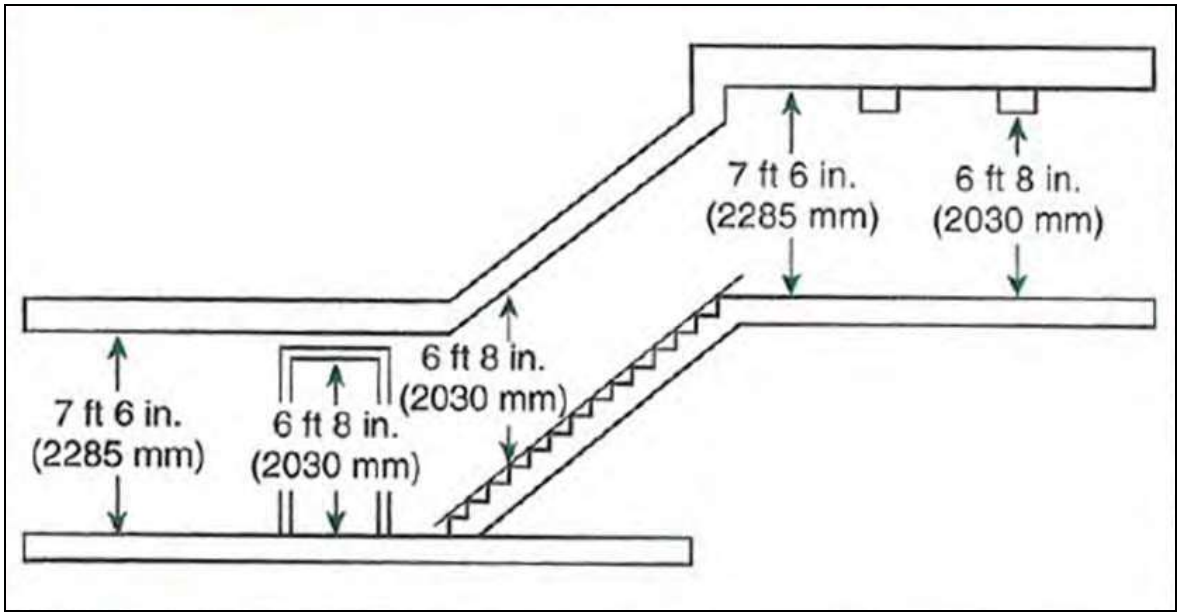

Figure 10.5.3 Measurement of Headroom Clearance (Source: UAE Fire and Life Safety Code of Practice)

10.6 Walking Surfaces in the Means of Egress

10.6.1 Approved existing walking surfaces shall be permitted.

10.6.2 Changes in Elevation

10.6.2.1 Abrupt changes in elevation of walking surfaces shall not exceed 1⁄4 in. (6.3 mm). Changes in elevation exceeding 1⁄4 in. (6.3 mm), but not exceeding 1⁄2 in. (13 mm), shall be beveled with a slope of 1 in 2.

10.6.2.2 Changes in elevation exceeding 1⁄2 in. (13 mm), shall be achieved with a ramp or stair.

10.6.3 Level. Walking surfaces shall comply with all of the following:

(1) The slope of a walking surface in the direction of travel shall not exceed 1 in 20.

(2) The slope perpendicular to the direction of travel shall not exceed 1 in 48.

10.7 Impediments to Egress

10.7.1 Any device or alarm installed to restrict the improper use of a means of egress shall be designed and installed so that it cannot, even in case of failure, impede or prevent emergency use of such means of egress.

10.8 Means of Egress Reliability

10.8.1 Maintenance. Means of egress shall be continuously maintained free of all obstructions or impediments to full instant use in the case of fire or other emergency.

10.8.2 Furnishings and Decorations in Means of Egress

10.8.2.1 No furnishings, decorations, or other objects shall obstruct exits or their access thereto, egress therefrom, or visibility thereof.

10.8.2.2 No obstruction by railings, barriers, or gates shall divide the means of egress into sections appurtenant to individual rooms, apartments, or other occupied spaces.

10.8.2.2 Mirrors shall not be placed on exit door leaves.

10.9 Means of Egress Components

10.9.1 Door Openings

10.9.1.1 General. Section 7.2.1 of NFPA 101 or any approved code/standard shall be followed.

10.9.1.1.1 Every door opening and every principal entrance that is required to serve as an exit shall be designed and constructed so that the path of egress travel is obvious and direct. Windows that, because of their physical configuration or design and the materials used in their construction, have the potential to be mistaken for door openings shall be made inaccessible to the occupants by barriers or railings.

10.9.1.2 Occupied Building. For the purposes of this Chapter, a building shall be considered to be occupied at any time if meets any of the following criteria:

(1) It is open for general occupancy

(2) It is open to the public

(3) It is occupied by more than 10 persons

10.9.1.3 Where means of egress doors are locked in a building that is not considered occupied, occupants shall not be locked beyond their control in buildings or building spaces, except for lockups in detention and correctional occupancies, and health care occupancies.

10.9.1.4 Door Leaf Width

10.9.1.4.1 Measurement of Clear Door Width. It shall be measured as follows.

(1) The measurement shall be taken at the narrowest point in the door opening

(2) For all doors, the measurement shall be taken with the door leaf in the fully open position.

(3) For new swinging doors assemblies, the measurement shall be taken with the door leaf open 90 degrees

(4) Projections of not more than 4 in. (100 mm) into the door opening width on the hinge side shall not be considered reductions in clear width, provided that such projections are for purposes of accommodating panic hardware or fire exit hardware and are located not less than 34 in. (865 mm), and not more than 48 in. (1220 mm), above the floor

(5) Projections exceeding 6 ft 8 in. (2030 mm) above the floor shall not be considered reductions in egress capacity width

10.9.1.4.2 Minimum Door Leaf Width. Door openings in means of egress shall be not less than 32 in. (810 mm) in clear width. Where a pair of doors is provided, not less than one of the doors shall provide not less than 32 in. (810 mm) clear width opening.

10.9.1.5 Swing and Force to Open

10.9.1.5.1 Swinging-Type Door Assembly Requirement. Any door assembly in a means of egress shall be of the side-hinged or pivoted-swinging type, and shall be installed to be capable of swinging from any position to the full required width of the opening in which it is installed.

10.9.1.5.2 Door leaves required to be of the side-hinged or pivoted-swinging type shall swing in the direction of egress travel.

10.9.1.5.3 In existing occupancies and where permitted elsewhere in these Provisions, horizontal-sliding or vertical-rolling security grilles or door assemblies that are part of the

required means of egress shall be permitted, provided that all of the following criteria are met:

(a) Such grilles or door assemblies shall remain secured in the fully open position during the period of occupancy by the general public.

(b) On or adjacent to the grill or door opening, there shall be a readily visible, that reads as follows:

THIS DOOR TO REMAIN OPEN WHEN THE SPACE IS OCCUPIED

(c) Door assembly is readily operable from either side without special knowledge or effort.

10.9.1.5.4 Horizontal-sliding doors are permitted in private garages, business areas, industrial areas, and storage areas with an occupant load not exceeding 10 persons contain only low or ordinary hazard contents, door openings to such areas and private garages shall be permitted to be horizontal-sliding door assemblies.

10.9.1.5.5 In private garages, business areas, industrial areas, and storage areas with an occupant load not exceeding 10 persons contain only low or ordinary hazard contents, door openings to such areas and private garages shall be permitted to be vertical-rolling door assemblies.

10.9.1.5.6 Doors other than the hoistway door; the elevator car door; and doors that are readily openable from the car side without a key, a tool, special knowledge, or special effort, shall be prohibited at the point of access to an elevator car.

10.9.1.6 Door Leaf Encroachment. During its swing, any door leaf in a means of egress shall leave not less than one-half of the required width of an aisle, a corridor, a passageway, or a landing unobstructed.

10.9.1.7 Door Leaf Operating Forces. Door leaf shall be such that these can be easily opened by all occupants.

10.9.1.8 Locks, Latches, and Alarm Devices

10.9.1.8.1 Door leaves shall be arranged to be opened readily from the egress side whenever the building is occupied.

10.9.1.8.2 Locks, if provided, shall not require the use of a key, a tool, or special knowledge or effort for operation from the egress side.

10.9.1.8.3 Exterior door assemblies shall be permitted to have key-operated locks from the egress side, provided that all of the following criteria are met:

(2) A readily visible sign that reads as follows is located on or adjacent to the door:

THIS DOOR TO REMAIN UNLOCKED WHEN THE BUILDING IS OCCUPIED

(3) The locking device is of a type that is readily distinguishable as locked.

(4) A key is immediately available to any occupant inside the building when it is locked.

10.9.1.8.4 Electrically Controlled Egress Door Assemblies. Door assemblies in the means of egress shall be permitted to be electrically locked, provided that all of the following conditions are met:

(1) The hardware for occupant release of the lock is affixed to the door leaf.

(2) The hardware has an obvious method of operation that is readily operated in the direction of egress.

(3) The hardware is capable of being operated with one hand in the direction of egress.

(4) Operation of the hardware interrupts the power supply directly to the electric lock and unlocks the door assembly in the direction of egress.

(5) Loss of power to the hardware automatically unlocks the door assembly in the direction of egress.

10.9.1.8.5 Every door assembly in a stair enclosure serving more than four stories, shall meet one of the following conditions:

(1) Re-entry from the stair enclosure to the interior of the building shall be provided.

(2) An automatic release that is actuated with the initiation of the building fire alarm system shall be provided to unlock all stair enclosure door assemblies to allow re-entry (see Figure 10.9.1.8.5).

10.9.1.8.6 Door assemblies on stair enclosures shall be permitted to be equipped with hardware that prevents re-entry into the interior of the building, provided that the following criteria are met:

(1) There shall be not less than two levels where it is possible to leave the stair enclosure to access another exit.

(2) There shall be not more than four stories intervening between stories where it is possible to leave the stair enclosure to access another exit.

(3) Re-entry shall be possible on the top story or next-to-top story served by the stair enclosure, and such story shall allow access to another exit.

(4) Door assemblies allowing re-entry shall be identified as such on the stair side of the door leaf.

(5) Door assemblies not allowing re-entry shall be provided with a sign on the stair side indicating the location of the nearest door opening, in each direction of travel, that allows re-entry or exit.

10.9.1.8.7 If a stair enclosure allows access to the roof of the building, the door to the roof either shall be kept locked or shall allow re-entry from the roof.

10.9.1.8.8 A latch or other fastening device on a door leaf shall be provided with a releasing device that has an obvious method of operation and that is readily operated under all lighting conditions.

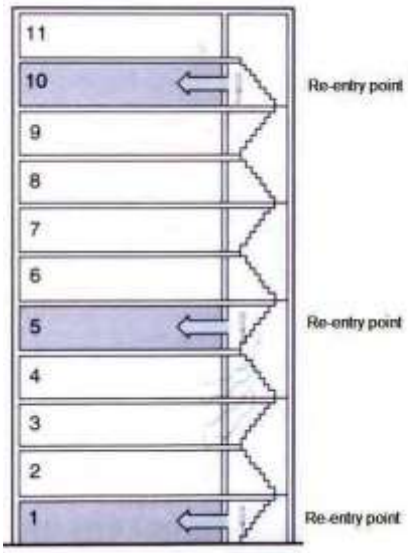

Figure 10.9.1.8.5. Re-entry Point (Source: UAE Fire and Life Safety Code of Practice)

10.9.1.8.9 Access-Controlled Egress Door Assemblies. Door assemblies in the means of egress shall be permitted to be equipped with an approved entrance and egress access control system, provided that all of the following criteria are met:

(1) A sensor shall be provided on the egress side, arranged to unlock the door leaf in the direction of egress upon detection of an approaching occupant.

(2) Door leaves shall automatically unlock in the direction of egress upon loss of power to the sensor.

(3) Door locks shall be arranged to unlock in the direction of egress from a manual release device, located on the egress side, 40 in. to 48 in. (1015 mm to 1220 mm) vertically above the floor, and within 60 in. (1525 mm) of the secured door openings.

(4) The manual release device shall be readily accessible and clearly identified by a sign that reads: PUSH TO EXIT.

(5) Activation of the building automatic sprinkler or fire detection system, if provided, shall automatically unlock the door leaves in the direction of egress, and the door leaves shall remain unlocked until the fire-protective signaling system has been manually reset.

10.9.1.8.10 Elevator Lobby Exit Access Door Assemblies Locking. Door assemblies separating the elevator lobby from the exit access shall be permitted to be electronically locked, provided that all the following criteria are met:

(1) The building is protected throughout by a fire alarm system in accordance with Section 9.7.

(2) The building is protected throughout by an approved supervised automatic sprinkler system in accordance with Section 9.3.

(3) The elevator lobby is protected by an approved, supervised smoke detection system in accordance with Section 9.7.

(4) Detection of smoke by the detection system required is arranged to initiate the building fire alarm system and notify building occupants.

(5) Loss of power to the elevator lobby electronic lock system unlocks the elevator lobby door assemblies.

(6) Once unlocked, the elevator lobby door assemblies remain unlocked until the building fire alarm system has been manually reset.

10.9.1.8.11 Panic Hardware and Fire Exit Hardware

10.9.1.8.11.1 Where a door assembly is required to be equipped with panic or fire exit hardware, such hardware shall consist of a cross bar or a push pad, the actuating portion of which extends across not less than one-half of the width of the door leaf.

10.9.1.8.11.2 Required panic hardware and fire exit hardware, in other than detention and correctional occupancies, shall not be equipped with any locking device, set screw, or other arrangement that prevents the release of the latch when pressure is applied to the releasing device.

10.9.1.8.12 Self-Closing Devices

10.9.1.8.12.1 A door leaf normally required to be kept closed shall not be secured in the open position at any time and shall be self-closing or automatic-closing.

10.9.1.8.12.2 A door shall be permitted to be automatic-closing, provided that all of the following criteria are met:

(1) Upon release of the hold-open mechanism, the leaf becomes self-closing.

(2) The release device is designed so that the leaf instantly releases manually and, upon release, becomes self-closing.

(3) The automatic releasing mechanism or medium is activated by the operation of approved smoke detectors.

(4) Upon loss of power to the hold-open device, the hold open mechanism is released and the door leaf becomes self-closing.

10.9.1.8.13 Fire Rating Requirements for Doors. Fire rating of doors shall be as follows based on location and occupancies in Table 10.9.1.8.13.

Table 10.9.1.8.13 Fire Rating Requirements for Doors at Various Locations (Source: UAE Fire and Life Safety Code of Practice)

OCCUPANCY	LOCATION	DOOR FIRE RATING	SMOKE PROOF	SELF CLOSING	LATCHES
All Occupancies	Exit Stairs	90 Minutes	Yes	Yes	Not Allowed
All Occupancies	Exit Discharge	90 Minutes	Yes	Yes	Not Allowed
All Occupancies	Exit Corridor	60 Minutes	Yes	No	Not Allowed
All Occupancies	Service Corridor	60 Minutes	No	No	Allowed
All Occupancies	Service Rooms	60 Minutes	No	No	Allowed
All Occupancies	Access Panel	60 Minutes	No	No	Allowed
All Occupancies	Elevator Lobby	60 Minutes	Yes	Yes	Not Allowed
All Occupancies	Horizontal Exits	90 Minutes	Yes	Yes	Not Allowed
Labor Accommodation	Room Door	30 Minutes	No	No	Allowed
Residential Flats	Main Flat Door	60 Minutes	No	No	Allowed
Hotels	Main Room Door	60 Minutes	No	No	Allowed
Office	Main Entrance	60 Minutes	Yes	Yes	Allowed

10.9.2 Elevator Landing and Lobby Exit Access

10.9.2.1 Each elevator landing and lobby shall have access to at least one exit.

10.9.2.2 The elevator landing and lobby exit access shall not require the use of a key, a tool, special knowledge, or special effort.

10.9.2.3 Doors separating the elevator lobby from the exit access shall be permitted to be electronically locked.

10.9.3 Exit Passageways

10.9.3.1 Exit corridors and passageways shall be of width not less than the aggregate required width of exit doorways leading from them in the direction of travel to the exterior.

10.9.3.2 Where stairways discharge through corridors and passageways, the height of corridors and passageways shall be not less than 2.4 m (8 ft).

10.9.3.3 All means of exit including staircases, lifts, lobbies and corridors shall be adequately ventilated.

10.9.3.4 Enclosure. An exit passageway shall be separated from other parts of the building as specified in Section 10.3

10.9.3.5 Stair Discharge. An exit passageway that serves as a discharge from a stair enclosure shall have not less than the same fire resistance rating and opening protective fire protection rating as those required for the stair enclosure.

10.9.3.6 Width. The width of an exit passageway shall be sized to accommodate the aggregate required capacity of all exits that discharge through it.

10.10 Capacity of Means of Egress

10.10.1 The total capacity of the means of egress for any story, balcony, tier, or other occupied space shall be sufficient for the occupant load determined in accordance with Section 10.10.2.

10.10.2 Occupant Load

10.10.2.1 The occupant load in any building or portion thereof shall be not less than the number of persons determined by dividing the floor area by the occupant load factor specified in Table 10.10.2.1.

Table 10.10.2.1 Occupant Load Factor

Use	(ft^2 per person)	(m^2 per person)
Assembly Use		
Concentrated use, without fixed seating	7	0.65
Less concentrated use, without fixed seating	15	1.4
Bench-type seating	1 person/18 linear inch	1 person/455 linear mm
Fixed seating	Use number of fixed seats	Use number of fixed seats
Waiting spaces	7	0.65
Kitchens	100	9.3
Library stack areas	100	9.3
Library reading rooms	50	4.6
Swimming pools	50 (water surface)	4.6 (water surface)
Swimming pool decks	30	2.8
Exercise rooms with equipment	50	4.6
Exercise rooms without equipment	15	1.4
Stages	15	1.4
Lighting and access catwalks, galleries, gridirons	100	9.3
Gaming areas	11	1
Skating rinks	50	4.6
Business Use (other than below)	100	9.3
Concentrated Business Use	50	4.6
Air traffic control tower observation levels	40	3.7
Day-Care Use	35	3.3
Detention and Correctional Use	120	11.1
Educational Use		
Classrooms	20	1.9
Shops, laboratories, vocational rooms	50	4.6
Health Care Use		
Inpatient treatment departments	240	22.3
Sleeping departments	120	11.1
Outpatient health care	150	13
Industrial Use		
General and high hazard industrial	100	9.3
Special-purpose industrial	NA	NA
Mercantile Use		
Sales area on street floor	30	2.8
Sales area on two or more street floor	40	3.7
Sales area on floor below street floor	30	2.8
Sales area on floors above street floor	60	5.6

Floors or portions of floors used only for offices	See business use	See business use.
Floors or portions of floors used only for storage, receiving, and shipping, and not open to general public	300	27.9
Mall buildings	Per factors applicable to use of space	
Residential Use		
Hotels and dormitories	200	18.6
Apartment buildings	200	18.6
Board and care, large	200	18.6
Storage Use		
In storage occupancies	NA	NA
In mercantile occupancies	300	27.9
In other than storage and mercantile occupancies	500	46.5

NA: Not applicable. The occupant load is the maximum probable number of occupants present at any time.

10.10.2.2 Exits Serving More than One Story. Where an exit serves more than one story, only the occupant load of each story considered individually shall be used in computing the required capacity of the exit at that story, provided that the required egress capacity of the exit is not decreased in the direction of egress travel.

10.10.2.3 Egress Capacity from a Point of Convergence. Where means of egress from a story above and a story below converge at an intermediate story, the capacity of the means of egress from the point of convergence shall be not less than the sum of the required capacity of the two means of egress.

10.10.2.4 Egress Capacity from Balconies and Mezzanines. Where any required egress capacity from a balcony or mezzanine passes through the room below, that required capacity shall be added to the required egress capacity of the room in which it is located.

10.10.2.5 Egress Capacity for Corridor

10.10.2.5.1 The required capacity of a corridor shall be the occupant load that utilizes the corridor for exit access divided by the required number of exits to which the corridor connects, but the corridor capacity shall be not less than the required capacity of the exit to which the corridor leads.

10.10.2.5.2 The clear width of any corridor or passageway serving an occupant load of 50 or more shall be not less than 1200 mm.

10.10.2.6 Egress Capacity for single exit access. Where a single exit access leads to an exit, its capacity in terms of width shall be not less than the required capacity of the exit to which it leads.

10.10.2.7 Egress Capacity for more than one exit access. Where more than one exit access leads to an exit, each shall have a width adequate for the number of persons it accommodates.

10.10.2.8 Egress Capacity for street floor exit. Street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs and ramps discharging through the street floor.

10.10.3 For other than existing means of egress, where more than one means of egress is required, the means of egress shall be of such width and capacity that the loss of anyone means of egress leaves available not less than 50 percent of the required capacity.

10.10.4 Egress Capacity

10.10.4.1 Egress capacity shall be based on the capacity factors shown in Table 10.10.4.1.

Table 10.10.4.1 Capacity Factors

Area	Stairways (width per person)		Level Components and Ramps (width per person)	
	in.	mm	in.	mm
Board and care	0.4	10	0.2	5
Health care, sprinklered	0.3	7.6	0.2	5
Health care, nonsprinklered	0.6	15	0.5	13
High hazard contents	0.7	18	0.4	10
All others	0.3	7.6	0.2	5

10.10.5 Measurement of Width of Means of Egress

10.10.5.1 The width of means of egress shall be measured at the narrowest point of the egress component under consideration.

10.10.5.2 Projections within the means of egress of not more than 4.5 in. (114 mm) on each side shall be permitted at a height of 38 in. (965 mm) and below. In the case of stair and landing handrails forming part of a guard, such projections shall be permitted at a height of 42 in. (1065 mm) and below.

10.10.5.3 Minimum Width

10.10.5.3.1 The width of any means of egress, shall not be less than 36 in. (915 mm) where another part of this chapter does not specify a minimum width.

10.10.5.3.2 The width of exit access serving not more than six people, and having a length not exceeding 50 ft (15 m) shall be not less than 28 in. (455 mm).

10.10.5.3.3 In existing buildings, the width of exit access shall be permitted to be not less than 28 in. (710 mm).

10.11 Number of Means of Egress

10.11.1 The number of means of egress shall be sufficient to accommodate the occupant load determined in accordance with Table 10.10.2.1 and complying with the travel distance requirements given in Table 10.11.1.

10.11.2 In new and existing occupancies**, t**he number of means of egress from any balcony, mezzanine, story, or portion thereof shall be not less than two.

10.11.3 In new occupancies, the number of means of egress from any story or portion thereof, shall be as follows:

(1) Occupant load more than 500 but not more than 1000 – not less than 3

(2) Occupant load more than 1000 – not less than 4

10.11.1.3 Accessible means of egress that do not utilize elevators shall be permitted to serve as any or all of the required minimum number of means of egress.

10.11.1.3 A single means of egress shall be permitted from a mezzanine, provided that the common path of travel does not exceed 23 m in case of non-sprinklered buildings and 30 m in case of sprinklered buildings.

10.11.1.4 Where more than one exit is required from a building or portion thereof, such exits shall be remotely located from each other and shall be arranged and constructed to minimize

the possibility that more than one has the potential to be blocked by any one fire or other emergency condition.

Table 10.11.1 Travel distance for occupancy and type of construction

S.No	Group of Occupancy	Maximum Travel Distance Construction	
		Types 1 and 2 (m)	Types 3 and 4 (m)
1	**2**	**3**	**4**
i)	Residential (A)	30.0	22.5
ii)	Educational (B)	30.0	22.5
iii)	Institutional (C)	30.0	22.5
iv)	Assembly (D)	30.0	30.0
v)	Business (E)	30.0	30.0
vi)	Mercantile (G)	30.0	30.0
vii)	Industrial (H)	45.0	Not permitted
viii)	Storage (J)	30.0	Not permitted
ix)	Hazardous (H)	22.0	Not permitted

Note: For fully sprinkled building, the travel distance may be increased by 50 percent of the values specified. Ramps shall be protected with automatic sprinkler system and shall be counted as one of the mean of escape.

10.11.1.3 Accessible means of egress that do not utilize elevators shall be permitted to serve as any or all of the required minimum number of means of egress.

10.11.1.4 The occupant load of each story considered individually shall be required to be used in computing the number of means of egress at each story, provided that the required number of means of egress is not decreased in the direction of egress travel.

10.11.1.5 Elevator Landing and Lobby Exit Access. Each elevator landing and lobby shall have access to at least one exit.

10.12 Arrangement of Means of Egress

10.12.1 General

10.12.1.1 Exits shall be located and exit access shall be arranged so that exits are readily accessible at all times.

10.12.1.2 Where exits are not immediately accessible from an open floor area, continuous passageways, aisles, or corridors leading directly to every exit, shall be maintained and shall be arranged to provide access for each occupant to not less than two exits by separate ways of travel.

10.12.1.3 Exit access from rooms or spaces shall be permitted to be through adjoining or intervening rooms or areas, provided that such rooms or areas are accessory to the area served. Foyers, lobbies, and reception rooms constructed as required for corridors shall not be construed as intervening rooms. Exit access shall be arranged so that it is not necessary to pass through any hazardous area.

14.12.1.4 Exit access corridors shall provide access to not less than two exits.

10.12.1.5 Exit access shall be arranged so that there are no dead ends in corridors.

10.12.1.6 Corridors shall provide exit access without passing through any intervening rooms other than corridors, lobbies, and other spaces permitted to be open to the corridor, unless otherwise permitted by AHJ due to practical difficulties.

10.12.1.7 Corridors that are not required to be fire resistance rated shall be permitted to discharge into open floor plan areas.

10.12.2 Travel Distance to Exits

10.12.2.1 Exits shall be so located that the travel distance on the floor shall not exceed the distance given in Table 10.11.1.

10.12.2.2 The travel distance to an exit from the dead end of a corridor shall not exceed half the distance specified in Table 10.11.1, except in assembly occupancies in which case it shall not exceed 6 m (20 ft).

10.12.3 Interlocking or scissor stairs

10.12.3.1 New interlocking or scissor stairs shall be permitted to be considered only as a single exit.

10.12.3.2 Existing interlocking or scissor stairs shall be permitted to be considered separate exits, provided that they meet all of the following criteria:

(1) They are separated from each other by 2-hour fire resistance–rated noncombustible construction.

(2) No protected or unprotected penetrations or communicating openings exist between the stair enclosures.

10.12.4 Remoteness of Exits

10.12.4.1 Where more than one exit, exit access, or exit discharge is required from a building or portion thereof, such exits, exit accesses, or exit discharges shall be remotely located from each other and be arranged to minimize the possibility that more than one has the potential to be blocked by any one fire or other emergency condition.

10.12.4.2 Where two exits, exit accesses, or exit discharges are required, they shall be located at a distance from one another not less than one-half the length of the maximum overall diagonal dimension of the building or area to be served, measured in a straight line between the nearest edge of the exits, exit accesses, or exit discharges.

10.12.4.3 In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.3, the minimum separation distance between two exits, exit accesses, or exit discharges, measured in accordance with Section 10.10.1.9.2, shall be not less than one-third the length of the maximum overall diagonal dimension of the building or area to be served.

10.12.4.4 In existing buildings, where more than one exit, exit access, or exit discharge is required, such exits, exit accesses, or exit discharges shall be exempt from the diagonal measurement separation distance criteria of Sections 10.10.4.2 and 10.10.4.3.

10.12.4.5 In other than existing buildings, where more than two exits, exit accesses, or exit discharges are required, at least two of the required exits, exit accesses, or exit discharges shall be arranged to comply with the minimum separation distance requirement.

10.12.4.6 The balance of the exits, exit accesses, or exit discharges shall be located so that, if one becomes blocked, the others are available.

10.12.5 Impediments to Egress

10.12.5.1 Access to an exit shall not be through kitchens, store rooms, restrooms, closets, bedrooms or similar spaces, or other rooms or spaces subject to locking, unless passage through such rooms or spaces is permitted for any occupancy elsewhere in these Provisions.

10.12.5.2 Exit access and exit doors shall be designed and arranged to be clearly recognizable.

10.12.5.3 Hangings, curtains or draperies shall not be placed over exit doors or located so that they conceal or obscure any exit.

14.12.5.4 Curtains shall be permitted across means of egress openings in tent walls, provided that all of the following criteria are met:

(1) They are distinctly marked in contrast to the tent wall so as to be recognizable as means of egress.

(2) They are installed across an opening that is at least 6 ft (1830 mm) in width.

(3) They are hung from slide rings or equivalent hardware so as to be readily moved to the side to create an unobstructed opening in the tent wall that is of the minimum width required for door openings.

10.13 Discharge from Exits

10.13.1 Exit Termination. Exits shall terminate directly, at public way or at an exterior exit discharge.

10.13.1.1 Yards, courts, open spaces, or other portions of the exit discharge shall be of required width and size to provide all occupants with a safe access to a public way.

10.13.1.2 The requirement of Section 10.13.1.1 shall not apply to interior exit discharge and to roof top exit discharge.

10.13.1.3 Means of egress shall be permitted to terminate in an exterior area of refuge for detention and correctional occupancies.

10.13.2 Exit shall be permitted to discharge to roofs or other sections of the building or an adjoining building where all of the following criteria are met:

(1) The roof/ceiling assembly has a fire resistance rating not less than that required for the exit enclosure.

(2) A continuous and safe means of egress from the roof is available.

10.13.3 Exit Discharge Through Interior Building Areas. Exits shall be permitted to discharge through interior building areas, provided that all of the following are met:

(1) Not more than 50 percent of the required number of exit stairs serving normally occupied areas of each floor, and not more than 50 percent of the exit stair capacity required for normally occupied areas of each floor, shall discharge through areas on any level of discharge.

(2) Each level of discharge shall discharge directly outside at the finished ground level or discharge directly outside and provide access to the finished ground level by outside stairs or outside ramps.

(3) The interior exit discharge shall lead to a free and unobstructed way to the exterior of the building, and such way shall be readily visible and identifiable from the point of discharge from the exit.

10.13.4 Arrangement and Marking of Exit Discharge. Doors, stairs, ramps, corridors, exit passageways, bridges, balconies, escalators, moving walks, and other components of an exit discharge shall be conspicuously marked and travel directions shall be clearly indicated.

10.14 Illumination of Means of Egress

10.14.1 Emergency and Escape Lighting

10.14.1.1 Emergency lighting shall be powered from a source independent of that supplying the normal lighting.

10.14.1.2 Escape lighting shall be capable of:

(1) Indicating clearly and unambiguously the escape routes

(2) Providing adequate illumination along such routes to allow safe movement of persons towards and through the exits

(3) Ensuring that fire alarm call points and fire fighting equipment provided along the escape routes can be readily located

10.14.1.3 The horizontal luminance at floor level on the centreline of an escape route shall be not less than 10 lux. In addition, for escape routes up to 2 m (6.5 ft) wide, 50 percent of the route width shall be lit to a minimum of 5 lux.

10.14.1.4 The emergency lighting shall be provided to be put on within 1s of the failure of the normal lighting supply.

10.14.1.5 Escape lighting luminaries should be sited to cover the following locations

(1) Near each intersection of corridors

(2) At each exit door

(3) Near each change of direction in the escape route. Near shall be considered to be within 2 m (6.5 ft) measured horizontally.

(4) Near each staircase so that each flight of stairs receives direct light

(5) Near any other change of floor level

(6) Outside each final exit and close to it

(7) Near each fire alarm call point

(8) Near fire-fighting equipment

(9) To illuminate exit and safety signs as required by the enforcing authority

10.14.1.6 Emergency lighting systems shall be designed to ensure that a fault or failure in any one luminaire does not reduce the effectiveness of the system.

10.14.1.7 The luminaires shall be mounted as low as possible, but at least 2 m (6.5 ft) above the floor level.

10.14.1.8 Signs are required at all exits, emergency exits and escape routes, which shall comply with the graphic requirements of the relevant standards.

10.14.1.9 Emergency lighting luminaires and their fittings shall be of non-flammable type.

10.14.1.10 Wiring and installation of the emergency lighting systems shall be of high quality so as to ensure their perfect serviceability at all times.

10.14.1.11 Emergency lighting system shall be capable of continuous operation for a minimum duration of 1 h and 30 minutes.

10.14.1.12 Emergency lighting system shall be maintained by periodical inspections and tests so as to ensure their perfect serviceability at all times.

10.14.2 Illumination of Means of Exit

10.14.2.1 The staircase and corridor lighting shall be on separate circuits and shall be independently connected so that it could be operated by one switch installation on the ground

floor easily accessible to fire fighting staff at any time irrespective of the position of the individual control of the light points, if any. It shall be of miniature circuit breaker type of switch so as to avoid replacement of fuse in case of crisis.

10.14.2.2 Staircase and corridor lighting shall also be connected to alternative supply. The alternative source of supply shall be provided by battery continuously trickle charged from the electric mains.

10.14.2.3 Suitable arrangements shall be made by installing double throw switches to ensure that the lighting installed in the staircase and the corridor does not get connected to two sources of supply simultaneously. Double throw switch shall be installed in the service room for terminating the stand-by supply.

10.14.2.4 Power Source. Where emergency lighting facilities are required for individual occupancies, the signs, other than approved self-luminous signs and listed/approved/approved photo luminescent signs shall be illuminated by the emergency lighting facilities.

10.14.2.5 Periodic Testing of Emergency Lighting Equipment

10.14.2.5.1 Emergency lighting systems shall be tested as follows:

(1) Functional testing shall be conducted monthly with a minimum of 3 weeks and a maximum of 5 weeks between tests, for not less than 30 seconds.

(2) Functional testing shall be conducted annually for a minimum of 1.5 hours if the emergency lighting system is battery powered.

(3) Written records of visual inspections and tests shall be kept by the owner for inspection by AHJ.

10.15 Marking of Means of Egress

10.15.1 Exits

10.15.1.1 Exits, shall be marked by an approved sign that is readily visible from any direction of exit access.

10.15.1.2 Horizontal components of the egress path within an exit enclosure shall be marked by approved exit or directional exit signs where the continuation of the egress path is not obvious.

10.15.1.3 Exit Stair Door Signage. Signage shall be provided to meet the following criteria:

(1) Signage shall be located at each exit door requiring an exit sign.

(2) Signage shall read as follows: EXIT

(3) Signage shall comply with any of the code/standard acceptable to AHJ.

10.15.2 Exit Access

10.15.2.1 Access to exits shall be marked by approved, readily visible signs in all cases where the exit or way to reach the exit is not readily apparent to the occupants.

10.15.2.2 New sign placement shall be such that no point in an exit access corridor is in excess of the rated viewing distance or 100 ft (30 m), whichever is less, from the nearest sign.

10.15.3 Directional exit signs shall be provided within horizontal components of the egress path within exit enclosures

10.15.4 No Exit

10.15.4.1 Any door, passage, or stairway that is neither an exit nor a way of exit access and that is located or arranged so that it is likely to be mistaken for an exit shall be identified by a sign that reads as follows: **NO EXIT**

10.16 Internal Staircases

10.16.1 Internal stairs shall be constructed of non-combustible materials throughout.

10.16.2 Internal stairs shall be constructed as a self-contained unit with an external wall of the building constituting at least one of its sides and shall be completely enclosed.

10.16.3 A staircase shall not be arranged round a lift shaft.

10.16.4 No gas piping or electrical panels shall be allowed in the stairway. Ducting in stairway shall be permitted if it is of 1 h fire resistance rating.

10.16.5 Following minimum width shall be provided for staircases, provided it is not less than minimum width specified for these occupancies elsewhere in these Provisions.

(1) Residential buildings (one to two family dwellings)	1.0 m (3.25 ft)
(2) Residential buildings (hotels and dormitories)	1.5 m (4.9 ft)
(3) Assembly buildings (like auditorium, theatres and cinemas)	2.0 m (6.5 ft)
(4) Educational buildings up to 30 m (98 ft) in height	1.5 m (4.9 ft)
(5) Health care occupancies	2.0 m (6.5 ft)
(6) All other buildings	1.5 m (4.9 ft)

10.16.6 The minimum width of tread without nosing shall be 250 mm for internal staircase of residential buildings. This shall be 300 mm (12 in.) for assembly, hotels, educational, business and other buildings.

10.16.7 The treads shall be constructed and maintained in a manner to prevent slipping.

10.16.8 The maximum height of riser shall be 190 mm (7.5 in.) for residential buildings and 150 mm (6 in.) for other buildings and the number shall be limited to 15 per flight.

10.16.9 Handrails shall be provided at a height of 1 m (3.25 ft) to be measured from the base of the middle of the treads to the top of the handrails.

10.16.10 Number of people in between floor landings in staircase shall not be less than the population on each floor for the purpose of design of staircase. The design of staircase shall also take into account the following

(1) No living space, store or other fire risk shall open directly into the staircase or staircases.

(2) External exit door of staircase enclosure at ground level shall open directly to the open spaces or through a large lobby, if necessary.

(3) The main and external staircases shall be continuous from ground floor to the terrace level.

(4) No electrical shafts, A/C ducts or gas pipes, etc. shall pass through or open in the staircases. (5) Lifts shall not open in staircase.

(6) No combustible material shall be used for decoration and wall panelling in the staircase.

(7) Beams, columns and other building features shall not reduce the head room and width of the staircase.

(8) The exit sign with arrow indicating the way to the escape route shall be provided at a suitable height from the floor level on the wall and shall be illuminated by electric light connected to corridor circuits.

(9) All exit way marking signs shall be flush with the wall and so designed that no mechanical damage shall occur to them due to moving of furniture or other heavy equipment.

(10) All landings of floor shall have floor indicating boards prominently indicating the number of floor. The floor indication board shall be placed on the wall immediately facing the flight of stairs and nearest to the landing. It shall be of size not less than 0.5×0.5 m (20x20 in.).

(11) Individual floors shall be prominently indicated on the wall facing the staircases.

(12) In case of single staircase, it shall terminate at the ground floor level and the access to the basement shall be by a separate staircase. The second staircase may lead to basement levels provided the same is separate at ground level by ventilated lobby with discharge points to two different ends through enclosures.

10.17 Pressurization of Staircases (Protected Escape Routes)

10.17.1 The pressurization of staircases shall be adopted for high rise buildings and building having mixed occupancy or multiplexes having covered area more than 500 m^2 (5380 ft^2).

10.17.2 The pressure difference for staircases shall be as under:

Box: A	Pressure Difference	
Building Height	Reduce Operation (Stage 1 of a 2-Stage System (Pa)	Emergency Operation (Stage 2 of a 2-Stage or Single Stage System) (Pa)
Less than 15 m (49 ft)	8	50
15 m (46 ft) or above	15	50

10.17.3 The difference in pressurization levels between staircase and lobbies (or corridors) shall not be greater than 5 Pa (0.1 psf).

10.17.4 Pressurization system shall be of two types:

(1) Single-stage, designed for operation only in the event of an emergency; and

(2) Two-stage, where normally a level of pressurization is maintained in the protected escape routes and an increased level of pressurization can be brought into operation in an emergency.

10.17.5 The normal air-conditioning system and the pressurization system shall be treated as an integral one, especially for a two-stage system. When the emergency pressurization is brought into action, the following changes in the normal air-conditioning system shall be effected

(1) Any re-circulation of air shall be stopped and all exhaust air vented to atmosphere.

(2) Any air supply to the spaces/areas other than escape routes shall be stopped.

(3) The exhaust system shall be continued provided

(a) The positions of the extraction grills permit a general air flow away from the protected escape route entry

(b) The construction of the ductwork and fans is such that, it will not be rendered inoperable by hot gases and smoke

(3) There is no danger of spread of smoke to other floors by the path of the extraction system which can be ensured by keeping the extraction fans running

10.17.6 The pressurization system shall be interconnected with the fire alarm system for actuation.

10.18 External Stairs

10.18.1 An external staircase shall be provided for high rise buildings.

10.18.2 External stairs shall always be kept in sound operable conditions.

10.18.3 All external stairs shall be directly connected to the ground.

10.18.4 Entrance to the external stairs shall be separate and remote from the internal staircase.

10.18.5 Care shall be taken to ensure that no wall opening or window opens on to or close to an external stairs.

10.18.6 The route to the external stairs shall be free of obstructions at all times.

10.18.7 The external stairs shall be constructed of non-combustible materials, and any doorway leading to it shall have the required fire resistance.

10.18.8 No external staircase, used as a fire escape, shall be inclined at an angle greater than 45° from the horizontal.

10.18.9 External stairs shall have straight flight not less than 1.25 m (4.10 ft) wide with 250 mm (10 in.) treads and risers not more than 190 mm (7.5 in.). The number of risers shall be limited to 15 per flight.

10.18.10 Handrails shall be of a height not less than 1 m (3.25 ft) and not exceeding 1.2 m (4 ft).

10.18.11 The use of spiral staircase shall be limited to a building not exceeding 9 m (29.5 ft) in height. A spiral stair case shall be not less than 1.5 m (5 ft) in diameter and shall be designed to give adequate headroom.

10.18.12 Unprotected steel frame staircase shall not be accepted as means of egress.

10.18.13 Steel staircase in an enclosed fire rated compartment of 2 h shall be accepted as means of escape.

10.19 Horizontal Exits

10.19.1 The width of horizontal exit shall be same as for the exit doorways.

10.19.2 A horizontal exit shall be equipped with at least one fire/smoke door of minimum 1 h fire resistance, of self-closing type.

10.19.3 For buildings more than 30 m (100 ft) in height, refuge area of 15 m^2 (161 ft^2) or an area equivalent to 0.3 m^2 (3.2 ft^2) per person to accommodate the occupants of two consecutive floors, whichever is higher.

10.19.4 The refuge area shall be provided on the periphery of the floor or on a cantilever projection and open to air at least on one side protected with suitable railings.

(1) For floors above 30 m (100 ft) and up to 45 m (150 ft): one refuge area on the floor immediately above 30 m (100 ft)

(2) For floors above 45 m (150 ft): one refuge area on the floor immediately above 45 m (150 ft) and so on after every 15 m (49 ft).

10.19.5 Residential flats in multi-storied building with balcony, shall not be provided with refuge area, however flats without balcony shall provide refuge area as given above.

10.19.6 Where there is a difference in level between connected areas for horizontal exits, ramps, not more than 1 in 10 m (32.8 ft) slope shall be provided; steps shall not be used.

10.19.7 Doors in horizontal exits shall be open-able at all times from both sides.

10.20 Fire Tower

10.20.1 Fire towers are the preferred type of escape route for storied buildings and these shall be considered as the safest route for escape. Their number, location and size shall depend on the building concerned, and its associated escape routes.

10.20.2 In high rise buildings with over 30 m (100 ft) in height, at least one required means of egress shall be a fire tower.

10.20.3 The fire towers shall be constructed of walls with a 2 h fire resistance rating without openings other than the exit doorways, with platforms, landings and balconies having the same fire-resistance rating.

10.21 Ramps

10.21.1 Ramps shall comply with all the applicable requirements for stairways regarding enclosure, capacity and limiting dimensions.

10.21.2 The slope of a ramp shall not exceed 1 in 10.

10.21.3 For all slopes exceeding 1 in 10 and wherever the use is such as to involve danger of slipping, the ramp shall be surfaced with approved non-slipping material.

10.22 Fire Lifts

10.22.1 Where applicable, fire lifts shall be provided with a minimum capacity for 8 passengers and fully automated with emergency switch on ground level.

10.22.2 Buildings 30 m (100 ft) in height or above shall be provided with fire lifts.

10.22.3 In case of fire, only fireman shall operate the fire lift.

10.22.3 Each fire lift shall be equipped with suitable inter-communication equipment for communicating with the control room on the ground floor of the building.

10.22.4 The number and location of fire lifts in a building shall be decided after taking into consideration various factors like building population, floor area, compartmentation, etc.

Chapter 11 Safeguarding Construction, Alteration, and Demolition Operations

11.1 General Requirements

11.1.1 Structures undergoing construction, alteration, or demolition operations, including those in underground locations this chapter.

11.1.2 A fire protection plan shall be established.

11.1.3 In buildings under construction, adequate escape facilities shall be maintained at all times for the use of construction workers. Escape facilities shall consist of doors, walkways, stairs, ramps, fire escapes, ladders, or other approved means or devices insofar as they can reasonably be applied to buildings under construction.

11.2 Processes and Hazards

11.2.1 Temporary Heating Equipment

11.2.1.1 Temporary heating equipment shall be listed/approved.

11.2.1.2 Temporary heating equipment shall be installed, used, and maintained in accordance with the manufacturer's instructions

11.2.1.3 Only personnel familiar with the operation of the temporary heating equipment shall be allowed to operate such devices.

11.2.1.4 Temporary heating equipment, where utilized, shall be monitored for safe operation and maintained by properly trained personnel.

11.2.1.5 Oil-fired heaters shall comply in design and installation features with Section 7.5.
11.2.1.6 Refueling operations shall be conducted in an approved manner.

11.2.2 Waste Disposal

11.2.2.1 Accumulations of combustible waste material, dust, and debris shall be removed from the structure and its immediate vicinity daily or more frequently as necessary for safe operations.

11.2.2.2 Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed/approved disposal container.

11.2.2.3 Trash chutes, where provided, shall comply with Sections 11.2.2.3.1 through 11.2.2.3.6.

11.2.2.3.1 A trash chute safety plan shall be submitted to and approved by AHJ.

11.2.2.3.2 Trash chutes used on the exterior of a building shall be of noncombustible construction, or protected in accordance with Sections 16.2.2.3.3 through 16.2.2.3.6 if of combustible construction.

11.2.2.3.3 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.

11.2.2.3.4 The temporary sprinkler required by Section 16.2.2.3.3 shall be protected by the recess as well as a listed/approved sprinkler guard.

11.2.2.3.5 The temporary sprinkler required by Section 16.2.2.3.3 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 in. (19 mm) and a listed flexible connector.

11.2.2.3.6 The temporary sprinkler required by Section 16.2.2.3.3 shall be protected against freezing where required by the AHJ.

11.2.2.4 Trash chutes used on the exterior of a building shall be of noncombustible construction, or protected in accordance with Sections 11.2.2.3.3 through 11.2.2.3.6 if of combustible construction.

11.2.3 Flammable and Combustible Liquids and Flammable Gases

11.2.3.1 Storage

11.2.3.1.1 Storage of Class I and Class II liquids shall not exceed 60 gal (227 L) within 50 ft (15 m) of the structure.

11.2.3.1.2 Storage areas shall be kept free of weeds, debris, and combustible materials not necessary to the storage.

11.2.3.1.3 Open flames and smoking shall not be permitted in flammable and combustible liquids storage areas.

11.2.3.1.4 Such storage areas shall be appropriately posted as "No Smoking" areas.

11.2.3.1.5 Storage areas shall be appropriately posted with markings

11.2.3.2 Handling of Flammable and Combustible Liquids at Point of Final Use

11.2.3.2.1 Class I and Class II liquids shall be kept in approved safety containers.

11.2.3.2.2 Means shall be provided to dispose of leakage and spills promptly and safely.

11.2.3.2.3 Class I liquids shall be dispensed only where there are no open flames or other sources of ignition within the possible path of vapor travel.

11.3 Fire Protection

11.3.1 Fire Safety Program

11.3.1.1 An overall construction or demolition fire safety program shall be developed.

11.3.1.2 All of the following items shall be addressed in the fire safety program:

(1) Good housekeeping

(2) On-site security

(3) Fire protection systems

(a) For construction operations, installation of new fire protection systems as construction progresses

(b) For demolition operations, preservation of existing fire protection systems during demolition

(4) Organization and training of an on-site fire brigade

(5) Development of a pre-fire plan

(6) Rapid communication

(7) Consideration of special hazards resulting from previous occupancies

(8) Protection of existing structures and equipment from exposure fires resulting from construction, alteration, and demolition operations.

11.3.2 Owner's Responsibility for Fire Protection

11.3.2.1 The owner shall designate a person who shall be responsible for the fire prevention program and who shall ensure that it is carried out to completion.

11.3.2.1.1 The fire prevention program manager shall have knowledge of the applicable fire protection standards, available fire protection systems, and fire inspection procedures.

11.3.2.2 Where guard service is provided, the fire prevention program manager shall be responsible for the guard service.

11.3.2.3 Program Manager Responsibilities

11.3.2.3.1 The manager shall be responsible for ensuring that proper training in the use of protection equipment has been provided.

11.3.2.3.2 The manager shall be responsible for the presence of adequate numbers and types of fire protection devices and appliances and for their proper maintenance.

11.3.2.3.3 A weekly self-inspection program shall be implemented, with records maintained and made available.

11.3.2.3.4 Impairments to the fire protection systems or fire alarm, detection, or communications systems shall be authorized only by the fire prevention program manager.

11.3.2.3.5 Temporary protective coverings used on fire protection devices during renovations, such as painting, shall be removed promptly when work has been completed in the area.

11.3.3 Fire Alarm Reporting

11.3.3.1 There shall be a readily available public fire alarm box near the premises, telephone service to the responding fire department, or equivalent facilities.

11.3.3.2 Instructions shall be issued for the immediate notification of the fire department in the case of a fire. Where telephone service is employed, the local fire department number and site address shall be conspicuously posted near each telephone.

11.3.3.3 Stairs

11.3.3.3.1 In all buildings over one story in height, at least one stairway shall be provided that is in usable condition at all times.

11.3.3.3.2 This stairway shall be extended upward as each floor is installed in new construction and maintained for each floor still remaining during demolition.

11.3.3.3.3 The stairway shall be lighted.

11.3.3.3.4 During construction, the stairway shall be enclosed where the building exterior walls are in place.

11.3.3.3.5 All exit stairs shall be provided with stair identification signs to include the floor level, stair designation, and exit path direction as required to provide for safe egress.

11.3.4 Standpipes. In all new buildings in which standpipes are required or where standpipes exist in buildings being altered or demolished, such standpipes shall be maintained in conformity with the progress of building construction in such a manner that they are always ready for use.

11.3.5 First-Aid Fire-Fighting Equipment

11.3.5.1 The suitability, distribution, and maintenance of extinguishers shall be in accordance with Section 9.6.

11.3.5.2 Wherever a tool house, storeroom, or other shanty is located in or adjacent to the building under construction or demolition, or where a room or space within that building is used for storage, a dressing room, or a workshop, at least one approved extinguisher shall be provided and maintained in an accessible location, unless otherwise permitted by Section 11.3.5.3.

11.3.5.3 The requirement of Section 11.3.5.2 shall be permitted to be waived where the structure does not exceed 150 ft^2 (14 m^2) in floor area or is equipped with automatic sprinklers or other approved protection.

11.3.5.4 At least one approved fire extinguisher also shall be provided in plain sight on each floor at each usable stairway as soon as combustible material accumulates.

11.3.5.5 Suitable fire extinguishers shall be provided on self-propelled equipment.

11.3.5.6 Free access to permanent, temporary or portable first-aid fire equipment shall be maintained at all times.

11.4 Safeguarding Construction and Alteration Operations

11.4.1 Scaffolding, Shoring, and Forms

11.4.1.1 Accumulations of unnecessary combustible forms or form lumber shall be prohibited.

11.4.1.2 Combustible forms or form lumber shall be brought into the structure only when needed.

11.4.1.3 Combustible forms or form lumber shall be removed from the structure as soon as stripping is complete.

11.4.1.4 Those portions of the structure where combustible forms are present shall not be used for the storage of other combustible building materials.

11.4.1.5 During forming and stripping operations, portable fire extinguishers or charged hose lines shall be provided to protect the additional combustible loading adequately.

11.4.2 Temporary Separation Walls

11.4.2.1 Protection shall be provided to separate an occupied portion of the structure from a portion of the structure undergoing alteration, construction, or demolition operations when such operations are considered as having a higher level of hazard than the occupied portion of the building.

11.4.2.2 Walls shall have at least a 1-hour fire resistance rating.

11.4.2.3 Opening protective shall have at least a 45-minute fire protection rating.

11.4.2.4 Nonrated walls and opening protective shall be permitted when an approved automatic sprinkler system is installed.

11.4.3 Fire Protection during Construction

11.4.3.1 Water Supply

11.4.3.1.1 A water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material accumulates.

11.4.3.1.2 There shall be no delay in the installation of fire protection equipment.

11.4.3.1.3 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.

11.4.3.2 Standpipes

11.4.3.2.1 General

11.4.3.2.1.1 The pipe size, hose valves, hose, water supply, and other details for new construction shall be in accordance with Section 9.2.

11.4.3.2.1.2 On permanent Type II and Type III standpipes, hose and nozzles shall be provided and made ready for use as soon as the water supply is available to the standpipe, unless otherwise permitted by Section 11.4.3.2.1.3.

11.4.3.2.1.3 In combined systems where occupant hose is not required, temporary hose and nozzles shall be provided during construction.

11.4.3.2.2 Standpipe Installations in Buildings under Construction. In buildings under construction, a standpipe system, either temporary or permanent in nature, shall be installed in accordance with Sections 11.4.3.2.2.1 through 11.4.3.2.2.7.

11.4.3.2.2.1 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.

11.4.3.2.2.2 The standpipes shall be securely supported and restrained at each alternate floor.

11.4.3.2.2.3 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.

11.4.3.2.2.4 Valves shall be kept closed at all times and guarded against mechanical injury.

11.4.3.2.2.5 The standpipes shall be extended up with each floor and shall be securely capped at the top.

11.4.3.2.2.6 Top hose outlets shall be not more than one floor below the highest forms, staging, and similar combustibles at all times.

11.4.3.2.2.7 Temporary standpipes shall remain in service until the permanent standpipe installation is complete.

11.4.4 Alteration of Buildings

11.4.4.1 Where the building is protected by fire protection systems, such systems shall be maintained operational at all times during alteration.

11.4.4.2 Where alteration requires modification of a portion of the fire protection system, the remainder of the system shall be kept in service and the fire department shall be notified.

11.4.4.3 Fire-resistive assemblies and construction shall be maintained.

11.5 Fire Safety During Demolition

11.5.1 If a building intended to be demolished contains a sprinkler system, such system shall not be rendered inoperative.

11.5.2 Combustible waste material shall not be burned at the demolition site unless. Combustible materials shall be removed from the site as often as necessary to minimize the hazards therefrom.

11.6 Asbestos Removal

11.6.1 Permits. Permits, where required, shall comply with Section 1.12.

11.6.2 Signs. Approved signs shall be posted at the entrance exit and exit access door, decontamination areas, and waste disposal areas for asbestos removal operations.

11.6.2.1 The signs shall state that asbestos is being removed from the area, that asbestos is a suspected carcinogen, and that proper respiratory protection is required.

11.6.2.2 Signs shall have a reflective surface, and lettering shall be a minimum of 2 in. (51 mm) high.

Chapter 12 Fire Department Access and Water Supply

12.1 General

12.1.1 Fire department access and water supplies shall comply with this chapter.

12.1.1 Application

12.1.1.1 This chapter shall apply to public and privately owned fire apparatus access roads.

12.1.1.2 This chapter shall apply to public and privately owned fire hydrant systems.

12.1.2 Permits. Permits, where required, shall comply with Section 1.12.

12.1.3 Plans

12.1.3.1 Fire Apparatus Access. Plans for fire apparatus access roads shall be submitted to AHJ for approval prior to construction.

12.1.3.2 Fire Hydrant Systems. Plans and specifications for fire hydrant systems shall be submitted to AHJ for approval prior to construction.

12.2 Fire Department Access

12.2.1 Fire department access and fire department access roads shall be provided and maintained in accordance with Section 12.2.

12.2.2 Access to Structures or Areas

12.2.2.1 Access Box(es). An access box(es) shall be installed in an accessible location where access to or within a structure or area is difficult because of security. The access box(es) shall be of an approved type.

12.2.2.2 Access to Gated Subdivisions or Developments. AHJ shall have the authority to require fire department access be provided to gated subdivisions or developments through the use of an approved device or system.

12.2.3 Open Spaces

12.2.3.1 The open spaces around or inside a building shall conform to the requirements of the relevant provisions. The following additional provisions of means of access to the building shall be ensured

a) The width of the main street on which the building abuts shall not be less than 12 m (39 ft) and one end of this street shall join another street not less than 12 m (39 ft) in width.

b) The road shall not terminate in a dead end; except in the case of residential building, up to a height of 30 m.

c) The compulsory open spaces around the building shall not be used for parking.

d) Adequate passageway and clearances required for fire fighting vehicles to enter the premises shall be provided at the main entrance; the width of such entrance shall be not less than 4.5 m (14.5 ft). If an arch or covered gate is constructed, it shall have a clear head-room of not less than 5 m (16 ft).

12.2.4 Fire Department Access Roads

12.2.4.1 Required Access

12.2.4.1.1 Approved fire department access roads shall be provided for every facility, building, or portion of a building hereafter constructed or relocated.

12.2.4.1.2 When fire department access roads cannot be installed due to location on property, topography, waterways, nonnegotiable grades, or other similar conditions, AHJ shall be authorized to require additional fire protection features.

12.2.4.2 Access to Building

12.2.4.2.1 A fire department access road shall extend to within 50 ft (15 m) of at least one exterior door that can be opened from the outside and that provides access to the interior of the building.

12.2.4.2.2 Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 ft (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility.

12.2.4.2.2.1 When buildings are protected throughout with an approved automatic sprinkler system, the distance in Section 12.2.4.2.2 shall be permitted to be increased to 450 ft (137 m).

12.2.4.3 Multiple Access Roads. More than one fire department access road shall be provided that access by a single road could be impaired by vehicle congestion, condition of terrain, climatic conditions, or other factors that could limit access.

12.2.4.4 Specifications

12.2.4.4.1 Dimensions

12.2.4.4.1.1 Fire department access roads shall have an unobstructed width of not less than 20 ft (6.1 m).

12.2.4.4.1.2 Fire department access roads shall have an unobstructed vertical clearance of not less than 13 ft 6 in. (4.1 m).

12.2.4.4.1.3 Vertical clearances or widths shall be increased when vertical clearances or widths are not adequate to accommodate fire apparatus.

12.2.4.4.2 Surface. Fire department access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with an all-weather driving surface.

12.2.4.4.3 Turning Radius

12.2.4.4.3.1 The turning radius of a fire department access road shall be as approved by AHJ.

12.2.4.4.3.2 Turns in fire department access roads shall maintain the minimum road width.

12.2.4.4.4 Dead Ends. Dead-end fire department access roads in excess of 150 ft (46 m) in length shall be provided with approved provisions for the fire apparatus to turn around.

12.2.4.4.5 Bridges

12.2.4.4.5.1 When a bridge is required to be used as part of a fire department access road, it shall be constructed and maintained in accordance with nationally recognized standards.

12.2.4.4.5.2 The bridge shall be designed for a live load sufficient to carry the imposed loads of fire apparatus.

12.2.4.4.5.3 Vehicle load limits shall be posted at both entrances to bridges where required by AHJ.

12.2.4.4.6 Grade

12.2.4.4.6.1 The gradient for a fire department access road shall not exceed the maximum approved.

12.2.4.4.6.2 The angle of approach and departure for any means of fire department access road shall not exceed 1 ft drop in 20 ft (0.3 m drop in 6 m) or the design limitations of the fire apparatus of the fire department, and shall be subject to approval by AHJ.

12.2.4.4.6.3 Fire department access roads connecting to roadways shall be provided with curb cuts extending at least 2 ft (0.61 m) beyond each edge of the fire lane.

12.2.5 Obstruction and Control of Fire Department Access Road

12.2.5.1 General

12.2.5.1.1 Minimum required widths and clearances established under Section 12.2.4.4 shall be maintained at all times.

12.2.5.1.2 Facilities and structures shall be maintained in a manner that does not impair or impede accessibility for fire department operations.

12.2.5.1.3 Entrances to fire department access roads that have been closed with gates and barriers in accordance with Section 12.2.5.2.1 shall not be obstructed by parked vehicles.

12.2.5.2 Closure of Access ways

12.2.5.2.1 AHJ shall be authorized to require the installation and maintenance of gates or other approved barricades across roads, trails, or other access ways not including public streets, alleys, or highways.

12.2.5.2.2 Where required, gates and barricades shall be secured in an approved manner.

12.3 Water Supplies

12.3.1 An approved water supply capable of supplying the required fire flow for fire protection shall be provided to all premises upon which facilities, buildings, or portions of buildings are hereafter constructed or moved into the jurisdiction. The approved water supply shall be in accordance with Section 12.4.

12.3.1.1 Where no adequate or reliable water distribution system exists, approved reservoirs, pressure tanks, elevated tanks, fire department tanker shuttles, or other approved systems capable of providing the required fire flow shall be permitted.

12.4 Fire Flow Requirements for Buildings

12.4.1 Scope

12.4.1.1 The procedure determining fire flow requirements for buildings hereafter constructed or moved into the jurisdiction shall be in accordance with Section 12.4.

12.4.1.2 Section 12.4 shall not apply to structures other than buildings.

12.5 Fire Hydrants

12.5.1 Fire Hydrant Locations and Distribution. Fire hydrants shall be provided in accordance with Section 12.5 for all new buildings, or buildings relocated into the jurisdiction unless otherwise permitted by Sections 12.5.1.1 or 12.5.1.2.

12.5.1.1 Fire hydrants shall not be required where the water distribution system is not capable of providing a fire flow of greater than 500 gpm (1893 L/min) at a residual pressure of 20 psi (139.9 kPa).

12.5.1.2 Fire hydrants shall not be required where modification or extension of the water distribution system is deemed to be impractical.

12.5.1.3 The distances specified in Section 12.5 shall be measured along fire department access roads in accordance with Section 12.2.4.

12.5.1.4 Where fire department access roads are provided with median dividers incapable of being crossed by fire apparatus, or where fire department access roads have traffic counts of more than 30,000 vehicles per day, hydrants shall be placed on both sides of the fire department access road on an alternating basis, and the distances specified by Section 12.5 shall be measured independently of the hydrants on the opposite side of the fire department access road.

12.5.1.5 Fire hydrants shall be located not more than 12 ft (3.7 m) from the fire department access road.

12.5.2 Detached One- and Two-Family Dwellings. Fire hydrants shall be provided for detached one- and two-family dwellings in accordance with both of the following:

(1) The maximum distance to a fire hydrant from the closest point on the building shall not exceed 600 ft (183 m).

(2) The maximum distance between fire hydrants shall not exceed 800 ft (244 m).

12.5.3 Buildings Other than Detached One- and Two-Family Dwellings. Fire hydrants shall be provided for buildings other than detached one- and two-family dwellings in accordance with both of the following:

(1) The maximum distance to a fire hydrant from the closest point on the building shall not exceed 400 ft (122 m).

(2) The maximum distance between fire hydrants shall not exceed 500 ft (152 m).

12.5.4 Minimum Number of Fire Hydrants for Fire Flow

12.5.4.1 The minimum number of fire hydrants needed to deliver the required fire flow for new buildings in accordance with Section 12.4 shall be determined in accordance with Section 12.5.4.

12.5.5 Testing and Maintenance

12.5.5.1 Private and public water supply systems shall be tested and maintained.

12.5.6 Accessibility. Fire hydrants and connections to other approved water supplies shall be accessible to the fire department.

12.5.7 Clear Space Around Hydrants

12.5.7.1 A 36 in. (914 mm) clear space shall be maintained around the circumference of fire hydrants except as otherwise required or approved.

12.5.7.2 A clear space of not less than 60 in. (1524 mm) shall be provided in front of each hydrant connection having a diameter greater than 2.5 in. (64 mm).

12.5.8 Protection. Where required by AHJ, fire hydrants subject to vehicular damage shall be protected unless located within a public right of way.

12.5.9 Hydrants Out of Service. Where water supplies or fire hydrants are out of service for maintenance or repairs, a visible indicator shall be used to indicate that the hydrant is out of service.

12.5.10 Marking of Hydrants

12.5.10.1 Fire hydrants shall be marked with an approved reflector affixed to the roadway surface.

12.5.10.2 Fire hydrants shall be marked with an approved flag or other device affixed to or proximate to the fire hydrant.

12.5.10.3 Fire hydrants shall be color coded or otherwise marked with an approved system indicating the available flow capacity.

Chapter 13 Combustible Waste and Refuse

13.1 General

13.1.1 Permits. Permits, where required, shall comply with Section 1.12.

13.1.2 Persons owning or having control of any property shall not allow any combustible waste material to accumulate in any area or in any manner that creates a fire hazard to life or property.

13.1.3 Combustible waste or refuse shall be properly stored or disposed of to prevent unsafe conditions.

13.1.4 Fire extinguishing capabilities approved by AHJ including, but not limited to, fire extinguishers, water supply and hose, and earth-moving equipment shall be provided at waste disposal sites.

13.1.5 Burning debris shall not be dumped at a waste disposal site except at a remote location on the site where fire extinguishment can be accomplished before compacting, covering, or other disposal activity is carried out.

13.1.6 Electrical Wiring

13.1.6.1 Electrical wiring and equipment in any combustible fiber storage room or building shall be installed in accordance with the requirements of Section 7.1 and NFPA 70 or any approved code/standard.

13.1.7 No Smoking

13.1.7.1 No smoking or open flame shall be permitted in any area where combustible wastes are handled or stored or within 50 ft (15 m) of any uncovered pile of such waste.

13.1.7.2 "No Smoking" signs shall be posted.

13.1.8 Vehicles or Conveyances Used to Transport Combustible Waste or Refuse

13.1.8.1 Vehicles or conveyances used to transport combustible waste or refuse over public thoroughfares shall have all cargo space covered and maintained tight enough to ensure against ignition from external fire sources and the scattering of burning and combustible debris that can come in contact with ignition sources.

13.1.8.2 Transporting burning waste or refuse shall be prohibited.

13.1.8.3 Trucks or automobiles, other than mechanical handling equipment and approved industrial trucks shall not enter any fiber storage room or building but shall be permitted to be used at loading platforms.

13.2 Combustible Waste and Refuse

13.2.1 Rubbish Containers

13.2.1.1 General. Rubbish containers kept outside of rooms or vaults shall not exceed 40.5 ft^3 (1.15 m^3) capacity.

13.2.1.1.1 Containers exceeding a capacity of 5-1⁄3 ft^3 [40 gal (0.15 m^3)] shall be provided with lids.

13.2.1.1.2 Such containers and lids as described in Section 13.2.1.1.1 shall be constructed of noncombustible materials or nonmetallic materials complying with Section 13.2.1.2.

13.2.1.2 Nonmetallic Containers

13.2.1.2.1 Nonmetallic rubbish containers exceeding a capacity of 5-1⁄3 ft^3 [40 gal ($0.15m^3$)] shall be manufactured of materials having a peak rate of heat release not exceeding 300 kW/m^2 at a flux of 50 kW/m^2.

13.2.1.2.2 Such containers shall be permanently labeled indicating capacity and peak rate of heat release.

13.2.1.3 Removal. Combustible rubbish stored in containers outside of noncombustible vaults or rooms shall be removed from buildings each working day.

13.2.1.4 Rubbish Within Dumpsters. Dumpsters and containers with an individual capacity of 1.5 yd^3 [40.5 ft^3 (1.15 m^3)] or more shall not be stored in buildings or placed within 10 ft (3 m) of combustible walls, openings, or combustible roof eave lines.

13.2.1.5 Commercial Rubbish-Handling Operations. Occupancies exclusively performing commercial rubbish handling or recycling shall maintain rubbish or product to be processed or recycled in one of the following ways:

(1) In approved vaults

(2) In covered metal or metal-lined receptacles or bins

(3) Completely baled and stacked in an orderly manner in an approved location

13.2.1.6 Approved metal receptacles with self-closing covers shall be provided for the storage or disposal of oil-soaked waste or cloths.

Chapter 14 Occupancy Fire Safety

14.1 Assembly Occupancies

14.1.1 Application. In addition to the requirements specified elsewhere in these Provisions, new and existing assembly occupancies shall comply with the provisions of Section 14.1 as added or modified.

14.1.1.1 Permits. Permits, where required, shall comply with Section 1.12.

14.1.1.2 Indoor children's playground structures shall also comply with Section 6.17.

14.1.2 Flame-Retardant Requirements

14.1.2.1 Scenery and stage properties not separated from the audience by proscenium opening protection shall be of non-combustible materials, limited-combustible materials, or fire retardant-treated wood.

14.1.3 Interior Finish

14.1.3.1 General. Interior wall, ceiling and floor finish shall be in accordance with Section 8.4.

14.1.3.2 Corridors, Lobbies, and Enclosed Stairways. New and existing interior wall and ceiling finish materials shall be Class A or Class B in all corridors, lobbies and enclosed stairways.

14.1.3.3 Assembly Areas. New and existing interior wall and ceiling finish materials shall be Class A or Class B in assembly areas having occupant loads of more than 300 and shall be Class A, Class B, or Class C in assembly areas having occupant loads of 300 or fewer.

14.1.3.4 New interior floor finish in exit enclosures and exit access corridors shall be not less than Class II.

14.1.3.5 Existing interior floor finish in exit enclosures and exit access corridors shall be permitted to remain in use, unless it is a severe hazard for life safety.

14.1.4 Special Amusement Buildings

14.1.4.1 Automatic Sprinklers. Every special amusement building, other than buildings or structures not exceeding 10 ft (3050 mm) in height and not exceeding 160 ft^2 (15 m^2) in aggregate horizontal projection, shall be protected throughout by an approved, supervised automatic sprinkler system.

14.1.4.2 Temporary Water Supply. Where the special amusement building is movable or portable, the sprinkler water supply shall be permitted to be provided by an approved temporary means.

14.1.4.3 Smoke Detection. Where the nature of the special amusement building is such that it operates in reduced lighting levels, the building shall be protected throughout by an approved automatic smoke detection system.

14.1.4.4 Alarm Initiation. Actuation of any smoke detection system device shall sound an alarm at a constantly attended location on the premises.

14.1.4.5 In special amusement buildings where mazes, mirrors, or other designs are used to confound the egress path, approved directional exit marking that becomes apparent in an emergency shall be provided.

14.1.5 Operating Features

14.1.5.1 Means of Egress Inspection

14.1.5.1.1 The building owner or agent shall inspect the means of egress, including door openings, to ensure it is maintained free of obstructions, and correct any deficiencies found, prior to each opening of the building to the public, shall maintain records of the date and time of each inspection on approved forms, listing any deficiencies found and actions taken to correct them.

14.1.5.2 Special Provisions for Food Service Operations

14.1.5.2.1 All devices in connection with the preparation of food shall be installed and operated to avoid hazard to the safety of occupants.

14.1.5.2.2 Portable cooking equipment that is not flue connected shall be permitted only as follows:

(1) Equipment fueled by small heat sources that can be readily extinguished by water, such as candles.

(2) Candles shall be permitted to be used on tables used for food service where securely supported on substantial non-combustible bases.

(3) Candle flames shall be protected.

(4) "Flaming sword" or other equipment involving open flames and flamed dishes, shall be permitted to be used.

(5) Approved LP-Gas commercial food service appliances shall be permitted to be used.

14.1.5.3 Open Flame Devices and Pyrotechnics. Open flame devices (candles, gas lights) and pyrotechnic special effect devices shall be permitted to be used on stages before proximate audiences for ceremonial or religious purposes, as part of a demonstration in exhibits, or as part of a performance, provided precautions satisfactory to AHJ are taken to prevent ignition of any combustible material.

14.1.5.4 Furnishings, Decorations, and Scenery

14.1.5.4.1 Fabrics and films used for decorative purposes, all draperies and curtains, and similar furnishings shall be not highly flammable.

14.1.5.4.2 AHJ shall impose controls on the quantity and arrangement of combustible contents in assembly occupancies to provide an adequate level of safety to life from fire.

14.1.5.5 Special Provisions for Exposition Facilities

14.1.5.5.1 General. No display or exhibit shall be installed or operated to interfere in any way with access to any required exit or with the visibility of any required exit or required exit sign; nor shall any display block access to fire-fighting equipment.

14.1.5.5.2 Materials Not on Display. A storage room having an enclosure consisting of a smoke barrier having a minimum 1-hour fire resistance rating and protected by an automatic extinguishing system shall be provided for combustible materials not on display, including combustible packing crates used to ship exhibitors' supplies and products.

14.1.5.5.3 Exhibits

14.1.5.5.3.1 The travel distance within the exhibit booth or exhibit enclosure to an exit access aisle shall not exceed 50 ft (15 m).

14.1.5.5.3.2 The upper deck of multilevel exhibits exceeding 300 ft^2 (28 m^2) shall have not less than two remote means of egress.

14.1.5.5.3.3 Exhibit booth construction materials shall be limited to the following:

(1) Noncombustible or limited-combustible materials

(2) Wood exceeding 1⁄4 in. (6.3 mm) nominal thickness

(3) Wood that is pressure-treated, fire-retardant wood.

(4) Flame-retardant materials.

(5) Textile wall coverings, plastics, foamed plastics and materials containing foamed plastics cardboard, honeycombed paper, and other combustible materials shall be used with additional measures of fire detection and extinguishing to the satisfaction of AHJ.

14.1.5.5.3.4 Curtains, drapes, and decorations shall not be highly flammable.

14.1.5.5.3.5 Acoustical and decorative material including, but not limited to, cotton, hay, paper, straw, moss, split bamboo, and wood chips shall be flame-retardant treated to the satisfaction of AHJ.

14.1.5.5.3.5.1 Where the aggregate area of acoustical and decorative materials is less than 10 percent of the individual floor or wall area, such materials shall be permitted to be used.

14.1.5.5.3.6 The following shall be protected by automatic extinguishing systems:

(1) Single-level exhibit booths exceeding 300 ft^2 (28 m^2) and covered with a ceiling

(2) Each level of multilevel exhibit booths, including the uppermost level where the uppermost level is covered with a ceiling

14.1.5.5.3.6.1 A single exhibit or group of exhibits with ceilings that do not require sprinklers shall be separated by a distance of not less than 10 ft (3050 mm) where the aggregate ceiling exceeds 300 ft^2 (28 m^2).

14.1.5.5.3.6.2 The water supply and piping for the sprinkler system shall be permitted to be of an approved temporary means that is provided by a domestic water supply, a standpipe system, or a sprinkler system.

14.1.5.5.3.7 Open flame devices within exhibit booths shall be permitted provided precautions satisfactory to AHJ are taken to prevent ignition of any combustible material.

14.1.5.5.3.8 Cooking and food-warming devices in exhibit booths shall comply all of the following:

(1) The use of LP-Gas cylinders shall be prohibited.

(2) The devices shall be isolated from the public by not less than 48 in. (1220 mm) or by a barrier between the devices and the public.

(4) Multi-well and single-well cooking equipment using combustible oils or solids shall meet all of the following criteria:

(a) The equipment shall have lids available for immediate use.

(b) The equipment shall be limited to 2 ft^2 (0.2 m^2) of cooking surface.

(c) The equipment shall be placed on non-combustible surface materials.

(d) The equipment shall be separated from each other by a horizontal distance of not less than 24 in. (610 mm).

(f) The equipment shall be kept at a horizontal distance of not less than 24 in. (610 mm) from any combustible material.

(5) A portable fire extinguisher in accordance with Section 9.6 shall be provided within the booth for each device, or an approved automatic extinguishing system shall be provided.

14.1.5.5.3.9 Combustible materials within exhibit booths shall be limited to a one-day supply. Storage of combustible materials behind the booth shall be prohibited.

14.1.5.5.3.10 Plans for the exposition, shall be submitted to AHJ for approval prior to setting up any exhibit. The plan shall show all details of the proposed exposition.

14.1.5.5.3.11 Vehicles. Vehicles on display within an exposition facility shall comply with Sections 14.1.5.5.4.12.1 through 14.1.5.5.4.12.5.

14.1.5.5.3.11.1 All fuel tank openings shall be locked and sealed in an approved manner to prevent the escape of vapors; fuel tanks shall not contain in excess of one-half their capacity or contain in excess of 10 gal (38 L) of fuel, whichever is less.

14.1.5.5.3.11.2 At least one battery cable shall be removed from the batteries used to start the vehicle engine, and the disconnected battery cable shall then be taped.

14.1.5.5.3.11.3 Batteries used to power auxiliary equipment shall be permitted to be kept in service.

14.1.5.5.3.11.4 Fueling or defueling of vehicles shall be prohibited.

14.1.5.5.3.11.5 Vehicles shall not be moved during exhibit hours.

14.1.5.5.3.12 Prohibited Materials

14.1.5.5.3.12.1 The following items shall be prohibited within exhibit halls:

(1) Compressed flammable gases

(2) Flammable or combustible liquids

(3) Hazardous chemicals or materials

(4) Class II or greater lasers, blasting agents, and explosives

14.1.5.6 Crowd Managers

14.1.5.6.1 Assembly occupancies shall be provided with a minimum of one trained crowd manager or crowd manager supervisor. Where the occupant load exceeds 250, additional trained crowd managers or crowd manager supervisors shall be provided at a ratio of 1 crowd manager or crowd manager supervisor for every 250 occupants.

14.1.5.6.2 This requirement shall not apply to assembly occupancies used exclusively for religious worship with an occupant load not exceeding 500.

14.1.5.6.3 The crowd manager shall receive approved training in crowd management techniques. **14.1.5.6.4** The training for the duties and responsibilities of crowd managers shall include the following:

(1) Understanding crowd manager roles and responsibilities

(2) Understanding safety and security hazards that can endanger public assembly

(3) Understanding crowd management techniques

(4) Introduction to fire safety and fire safety equipment

(5) Understanding methods of evacuation and movement

(6) Understanding procedures for reporting emergencies

(7) Understanding crowd management emergency response procedures

(8) Understanding the paths of travel and exits, facility evacuation and emergency response procedures and, where provided, facility shelter-in-place procedures

(9) Familiarization with the venue and guest services training

(10) Other specific event-warranted training

14.1.5.6.5 The training for the duties and responsibilities of crowd manager supervisors shall include the following:

(1) The duties described in Section 14.1.5.6.3

(2) Understanding crowd manager supervisor roles and responsibilities

(3) Understanding of incident management procedures

(4) Understanding the facility evacuation plan

(5) Understanding the facility command structure

14.1.5.7 Drills

14.1.5.7.1 The employees or attendants of assembly occupancies shall be trained and drilled in the duties they are to perform in case of fire, panic, or other emergency to effect orderly exiting.

14.1.5.7.2 Employees or attendants of assembly occupancies shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.

14.1.5.7.3 In the following assembly occupancies, an audible announcement shall be made, or a projected image shall be shown, prior to the start of each program that notifies occupants of the location of the exits to be used in case of a fire or other emergency:

(1) Theaters

(2) Motion picture theaters

(3) Auditoriums

(4) Other similar assembly occupancies with occupant loads exceeding 300 where there are non-continuous programs.

14.1.5.7.4 The requirement of Section 14.1.5.7.3 shall not apply to assembly occupancies in schools where used for nonpublic events.

14.1.5.8 Smoking

14.1.5.8.1 In rooms or areas where smoking is prohibited, plainly visible signs shall be posted that read as follows: NO SMOKING.

14.1.5.8.2 No person shall smoke in prohibited areas that are so posted, except under both of the following conditions:

(1) Smoking shall be permitted on a stage only where it is a necessary and rehearsed part of a performance.

(2) Smoking shall be permitted only where the smoker is a regular performing member of the cast.

14.1.5.8.3 Where smoking is permitted, suitable ashtrays or receptacles shall be provided in convenient locations.

14.1.5.9 Seating

14.1.5.9.1 Secured Seating

14.1.5.9.1.1 Seats in assembly occupancies accommodating more than 200 persons shall be securely fastened to the floor, except where fastened together in groups of not less than three.

14.1.5.9.1.2 Balcony and box seating areas that are separated from other areas by rails, guards, partial-height walls, or other physical barriers and have a maximum of 14 seats shall be exempt from the requirement of Section 14.1.5.9.1.1.

14.1.5.9.2 Unsecured Seating

14.1.5.9.2.1 Seats not secured to the floor shall be permitted in restaurants, and other occupancies where fastening seats to the floor might be impracticable.

14.1.5.9.2.2 Unsecured seats shall be permitted, provided that, there is not more than one seat for each 15 ft^2 (1.4 m^2) of net floor area, and adequate aisles to reach exits are maintained at all times.

14.1.5.9.3 Festival Seating. Festival seating shall be permitted in assembly occupancies having occupant loads of 250 or less only.

14.1.5.9.4 Occupant Load Posting

14.1.5.9.4.1 Every room constituting an assembly occupancy and not having fixed seats shall have the occupant load of the room posted in a conspicuous place near the main exit from the room.

14.1.5.9.4.2 Signs shall be legible, durable and shall indicate the number of occupants permitted for each room use.

14.1.5.10 Clothing

14.1.5.10.1 Clothing and personal effects shall not be stored in corridors, except if these are protected by an approved, supervised automatic sprinkler system.

14.1.5.10.2 This requirement shall not apply to storage in metal lockers.

14.1.5.11 Projection Rooms

14.1.5.11.1 In new assembly occupancies, film or video projectors or spotlights utilizing light sources that produce particulate matter or toxic gases, or light sources that produce hazardous radiation, without protective shielding shall be located within a projection room that is separated from other part of the building by fire barrier having 2 h fire resistance rating.

14.1.5.11.2 Every projection room shall be of permanent construction consistent with the building construction type in which the projection room is located and shall comply with the following:

(1) Openings shall not be required to be protected.

(2) The room shall have a floor area of not less than 80 ft^2 (7.4 m^2) for a single machine and not less than 40 ft^2 (3.7 m^2) for each additional machine.

(3) Each motion picture projector, floodlight, spotlight, or similar piece of equipment shall have a clear working space of not less than 30 in. (760 mm) on each side and at its rear, but only one such space shall be required between adjacent projectors.

14.2 Educational Occupancies

14.2.1 Application and Compliance

14.2.1.1 In addition to the requirements specified elsewhere in these Provisions, new and existing educational occupancies shall comply with Section 14.2.

14.2.1.2 One and two story new and existing educational occupancies shall be exempted from all the provisions related to interior wall, ceiling and floor finishes.

14.2.1.3 Educational occupancies shall meet both of the following criteria:

(1) The purpose is primarily education.

(2) The children are all 24 months of age or older.

14.2.2 Means of Egress

14.2.2.1 General. Means of egress shall be in accordance with Chapter 10.

14.2.2.2 Every room with a capacity of over 40 students or being used for over 40 students, shall have at least two doors.

14.2.2.3 Flexible Plan and Open Plan Buildings

14.2.2.3.1 Each room occupied by more than 300 persons shall have two or more means of egress entering into separate atmospheres.

14.2.2.3.2 Where three or more means of egress are required, the number of means of egress permitted to enter into the same atmosphere shall not exceed two.

14.2.2.3.3 Flexible plan buildings shall be permitted to have walls and partitions rearranged provided means of egress and other fire safety measures are not compromised.

14.2.3 Interior Finish

14.2.3.1 General. Interior finish shall be in accordance with Section 8.4.

14.2.3.2 New and existing interior wall and ceiling finish materials complying with Section 8.4 shall be permitted as follows:

(1) Exits – Class A

(2) In new educational occupancies other than exits – Class A or Class B

(3) In existing educational occupancies, in corridors and lobbies only – Class A or Class B

14.2.3.3 New interior floor finish in exit enclosures and exit access corridors shall be not less than Class II.

14.2.3.4 Existing interior floor finish in exit enclosures and exit access corridors shall be permitted to remain in use, unless it is a severe hazard for life safety.

14.2.4 Furnishings and Decorations

14.2.4.1 Draperies, curtains, and other similar furnishings and decorations in educational occupancies shall not be of highly flammable or explosive nature.

14.2.4.2 Clothing and personal effects shall not be stored in corridors.

14.2.4.3 Artwork and teaching materials shall be permitted to be attached directly to the walls in accordance with the following:

(1) In new and existing educational occupancies, the artwork and teaching materials shall not exceed 20 percent of the wall area in a building that is not protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.3.

(2) In new and existing educational occupancies, the artwork and teaching materials shall not exceed 50 percent of the wall area in a building that is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.3.

14.2.5 Heating Equipment

14.2.5.1 Unvented fuel-fired heating equipment, other than gas space heaters, shall be prohibited.

14.2.5.2 Electric heaters shall be prohibited.

14.2.6 Assembly Halls and Examination Halls

14.2.6.1 Rooms where more than 100 people gather shall be considered assembly occupancies and shall comply with Section 14.1.

14.2.7 Operating Features

14.2.7.1 Emergency action plans shall be provided in accordance with Section 6.8.

14.2.7.2 Emergency Egress Drills.

14.2.7.2.1 Emergency egress drills shall be conducted in accordance with Section 6.5.

14.2.7.2.2 Emergency egress drills shall be conducted as follows:

(1) Not less than one emergency egress drill shall be conducted quarterly when the facility is in session

(3) One additional emergency egress drill, other than for educational occupancies that are open on a year-round basis, shall be required within the first 15 days of start of the academic year.

(2) All occupants of the building shall participate in the drill.

14.2.7.3 All emergency drill alarms shall be sounded on the fire alarm system.

14.2.7.4 Inspection

14.2.7.4.1 It shall be the duty of principal or person designated by the principal to inspect all means of egress daily to ensure that all stairways, doors, exit paths, exit access, exit access corridors and other means of egress are in operable condition and free of obstructions.

14.2.7.4.2 It shall be the duty of principal or person designated by the principal to inspect weekly that fire and smoke alarms, fire extinguishers, automatic sprinklers systems and other fire protection systems are in operable condition.

14.2.7.4.3 Open plan buildings shall require extra surveillance to ensure that exit paths are maintained clear of obstruction and are obvious.

14.2.8 Additional Requirements

14.2.8.1 Storage of volatile flammable liquids shall be prohibited and the handling of such liquids shall be restricted to the laboratories only.

14.2.8.2 Each building shall be provided with an approved outside gas shut-off valve conspicuously located and marked, and easily accessible.

14.2.8.3 Each building shall be provided with an approved outside electricity meter conspicuously located and marked, and easily accessible.

14.3 Day-Care Occupancies

14.3.1 Application and Compliance

14.3.1.1 In addition to the requirements specified elsewhere in these Provisions, new and existing day-care occupancies shall comply with the provisions of Section 14.3 as added or modified.

14.3.1.2 Section 14.3 shall also apply to day-care homes in which more than 5, but not more than 12, clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than 24 hours per day, generally within a dwelling unit.

14.3.1.3 Facilities that supervise clients on a temporary basis with a parent or guardian in close proximity shall not be required to meet the provisions of Section 14.3.

14.3.1.4 Occupancies that include preschools, kindergartens, and other schools whose purpose are primarily educational for children 24 months of age or older, even though the children who attend such schools are of preschool age, shall comply with the provisions of Section 14.2.

14.3.2 General Requirements

14.3.2.1 Day-Care Staff. Adequate adult staff shall be on duty and alert at all times when and where clients are present.

14.3.2.2 Every door latch to closets, storage areas, kitchens, and other similar spaces or areas shall be such that clients can open the door from inside the space or area.

14.3.2.3 Every bathroom door lock shall be designed to allow opening of the locked door from the outside by an opening device that shall be readily accessible to the staff.

14.3.2.4 Flexible Plan and Open Plan Buildings

14.3.2.4.1 Flexible and open plan buildings shall be permitted to have walls and partitions rearranged provided means of egress and other fire safety measures are not compromised.

14.3.2.4.2 Each room occupied by more than 300 persons shall have two or more means of egress entering into separate atmospheres.

14.3.2.4.3 Where three or more means of egress are required from a single room, the number of means of egress permitted to enter into a common atmosphere shall not exceed two.

14.3.3 Interior Wall, Ceiling and Floor Finish. Provisions of Section 14.3.2 shall apply.

14.3.4 Furnishings and Decorations. Provisions of Section 14.2.4 shall apply.

14.3.5 Heating Equipment. Provisions of Section 14.2.5 shall apply.

14.3.6 Operating Features

14.3.6.1 Emergency Action Plans. Emergency action plans shall be provided in accordance with Section 6.8.

14.3.6.2 Emergency Egress and Relocation Drills

14.3.6.2.1 Emergency egress and relocation drills shall be conducted in accordance with Section 6.5.

14.3.6.2.2 Emergency egress and relocation drills shall be conducted as follows:

(1) Not less than one emergency egress and relocation drill shall be conducted every month the facility is in session.

(2) All occupants of the building shall participate in the drill.

(3) One additional emergency egress and relocation drill, other than for day-care occupancies that are open on a year-round basis, shall be required within the first 15 days of operation.

14.3.7 Inspections

14.3.7.1 Fire prevention inspections shall be conducted monthly by a trained senior member of the staff and proper record of the inspections is maintained.

14.3.7.2 It shall be the duty of site administrators and staff members to inspect all exit facilities daily to ensure that all stairways, doors, and other exits are in proper condition.

14.4 Health Care Occupancies

14.4.1 Application and Compliance

14.4.1.1 In addition to the requirements specified elsewhere in these Provisions, new and existing health care occupancies shall comply with the provisions of Section 14.4 as added or modified.

14.4.1.2 One and two story new and existing health care occupancies shall be exempted from all the provisions related to interior wall, ceiling and floor finishes.

14.4.2 Operating Features

14.4.2.1 Evacuation and Relocation Plan and Fire Drills

14.4.2.1.1 The administration of every health care occupancy shall have, in effect and available to all supervisory personnel, written copies of a plan for the protection of all persons in the event of fire, for their evacuation to areas of refuge, and for their evacuation from the building when necessary.

14.4.2.1.2 All employees shall be periodically instructed and kept informed with respect to their duties under the plan required by Section 14.4.2.1.1.

14.4.2.1.3 A copy of the plan required by Section 14.4.2.1.1 shall be readily available at all times in the telephone operator's location or at the security center or at any other location decided by the administration.

14.4.2.1.4 Fire Drill provisions of Section 6.5 shall apply.

14.4.2.1.5 Fire drills in health care occupancies shall include the transmission of a fire alarm signal and simulation of emergency fire conditions.

14.4.2.1.6 Infirm or bedridden patients shall not be required to be moved during drills to safe areas or to the exterior of the building.

14.4.2.1.7 Drills shall be conducted quarterly on each shift to familiarize facility personnel (nurses, interns, maintenance engineers, and administrative staff) with the signals and emergency action required under varied conditions.

14.4.2.1.8 When drills are conducted between 9:00 p.m. (2100 hours) and 6:00 a.m. (0600 hours), a coded announcement shall be permitted to be used instead of audible alarms.

14.4.2.1.9 Employees of health care occupancies shall be instructed in life safety procedures and devices.

14.4.2.2 Procedure in Case of Fire

14.4.2.2.1 Protection of Patients

14.4.2.2.1.1 The basic response required of staff shall include the following:

(1) Removal of all occupants directly involved with the fire emergency

(2) Transmission of an appropriate fire alarm signal to warn other building occupants and summon staff

(3) Confinement of the effects of the fire by closing doors to isolate the fire area

(4) Relocation of patients as detailed in the health care occupancy's fire safety plan

14.4.2.2.2 Fire Safety Plan. A written health care occupancy fire safety plan shall provide for the following:

(1) Use of alarms

(2) Transmission of alarms to fire department

(3) Emergency phone call to fire department

(4) Response to alarms

(5) Isolation of fire

(6) Evacuation of immediate area

(7) Evacuation of smoke compartment

(8) Preparation of floors and building for evacuation

(9) Extinguishment of fire

(10) Location and operation of doors disguised with murals

14.4.2.2.3 Staff Response

14.4.2.2.3.1 All health care occupancy personnel shall be instructed in the use of and response to fire alarms.

14.4.2.2.3.2 All health care occupancy personnel shall be instructed in the use of the code phrase to ensure transmission of an alarm under the following conditions:

(1) When the individual who discovers a fire must immediately go to the aid of an endangered person

(2) During a malfunction of the building fire alarm system

14.4.2.2.3.3 Personnel hearing the code announced shall first activate the building fire alarm using the nearest manual fire alarm box and then shall execute immediately their duties as outlined in the fire safety plan.

14.4.2.3 Maintenance of Means of Egress

14.4.2.3.1 Proper maintenance shall be provided to ensure the dependability of the method of evacuation selected.

14.4.2.3.2 Health care occupancies that find it necessary to lock means of egress doors shall, at all times, maintain an adequate staff qualified to release locks and direct occupants from the immediate danger area to a place of safety in case of fire.

14.4.2.3.3 Where required by AHJ, a floor plan shall be provided to indicate the location of all required means of egress corridors in smoke compartments having spaces not separated from the corridor by partitions.

14.4.2.4 Smoking. Smoking regulations shall be adopted and shall include not less than the following provisions:

(1) Smoking shall be prohibited in any room, ward, or individual enclosed space where flammable liquids, combustible gases, or oxygen is used or stored and in any other hazardous location, and such areas shall be posted with signs that read NO SMOKING or shall be posted with the international symbol for no smoking.

(2) In health care occupancies where smoking is prohibited and signs are prominently placed at all major entrances, secondary signs with language that prohibits smoking shall not be required.

(3) Smoking by patients classified as not responsible shall be prohibited.

(4) The requirement of Section 14.4.2.4 (3) shall not apply where the patient is under direct supervision.

(5) Ashtrays of noncombustible material and safe design shall be provided in all areas where smoking is permitted.

(6) Metal containers with self-closing cover devices into which ashtrays can be emptied shall be readily available to all areas where smoking is permitted.

14.4.2.5 Furnishings, Mattresses, and Decorations

14.4.2.5.1 Draperies, curtains, and other loosely hanging fabrics and films serving as furnishings or decorations in healthcare occupancies shall not be highly flammable and of explosive nature, and the following shall apply:

(1) Such curtains shall include cubicle curtains.

(2) Such curtains shall not include curtains at showers and baths.

(3) Such draperies and curtains shall not include draperies and curtains at windows in patient sleeping rooms in sprinklered smoke compartments.

(4) Such draperies and curtains shall not include draperies and curtains in other rooms or areas where the draperies and curtains comply with all of the following:

(a) Individual drapery or curtain panel area does not exceed 48 ft^2 (4.5 m^2).

(b) Total area of drapery and curtain panels per room or area does not exceed 20 percent of the aggregate area of the wall on which they are located.

(c) Smoke compartment in which draperies or curtains are located is sprinklered.

14.4.2.5.2 Newly introduced upholstered furniture and mattresses within new health care occupancies shall be in a building protected throughout by an approved, supervised automatic sprinkler system in accordance with NFPA 13 or any approved code/standard.

14.4.2.5.3 Newly introduced upholstered furniture and mattresses within existing health care occupancies shall be permitted in rooms and buildings, where a battery-powered smoke detector is installed.

14.4.2.5.4 Combustible decorations shall be prohibited in any new health care occupancy, unless following conditions are met:

(1) They are flame-retardant or are treated with approved fire-retardant coating that is approved for application to the material to which it is applied.

(2)The decorations, such as photographs, paintings, and other art, are attached directly to the walls, ceiling, and non-fire-rated doors in accordance with the following:

(a) Decorations on non-fire-rated doors do not interfere with the operation or any required latching of the door and do not exceed the area limitations of Section 14.4.2.5.4 (b), (c), or (d).

(b) Decorations do not exceed 20 percent of the wall, ceiling, and door areas inside any room or space of a smoke compartment that is not protected throughout by an approved automatic sprinkler system in accordance with Section 9.3.

(c) Decorations do not exceed 30 percent of the wall, ceiling, and door areas inside any room or space of a smoke compartment that is protected throughout by an approved supervised automatic sprinkler system in accordance with Section 9.3.

(d) Decorations do not exceed 50 percent of the wall, ceiling, and door areas inside patient sleeping rooms having a capacity not exceeding four persons, in a smoke compartment that is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.3.

14.4.2.5.5 In existing health care occupancies, decorations, such as photographs or paintings, are in such limited quantities that a hazard of fire development or spread is not present.

14.4.2.6 Portable Space-Heating Devices. Portable space heating devices shall be prohibited in all health care occupancies except in non-sleeping staff and employee areas.

14.4.3 Interior Finish

14.4.3.1 General. Interior finish shall be in accordance with Section 8.4

14.4.3.2 New Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials complying with Section 8.4 shall be permitted throughout if Class A, except as indicated in Section 14.4.3.2.1 or 14.4.3.2.2.

14.4.3.2.1 New walls and ceilings shall be permitted to have Class A or Class B interior finish in individual rooms having a capacity not exceeding four persons.

14.4.3.2.2 New corridor wall finish not exceeding 48 in.(1220mm) in height that is restricted to the lower half of the wall shall be permitted to be Class A or Class B.

14.4.3.2.3 Existing Interior Wall and Ceiling Finish. Existing interior wall and ceiling finish materials complying with Section 8.4 shall be permitted to be Class C.

14.4.3.3 Interior Floor Finish

14.4.3.3.1 New interior floor finish shall comply with Section 8.4.

14.4.3.3.2 New interior floor finish in exit enclosures and exit access corridors shall be Class I or Class II.

14.4.3.3.3 Existing Interior Floor Finish. No restrictions shall apply to existing interior floor finish.

14.4.4 Means of Egress

14.4.4.1 In buildings or sections occupied by bedridden patients where the floor area is over 280 m^2 (3015 ft^2), facilities shall be provided to move patients in hospital beds to the other side of a smoke barrier from any part of such building or section not directly served by approved horizontal exits.

14.4.4.2 Not less than two exits of one or more of the following types shall be provided for every floor, including basement, of every building or section:

(1) Doors leading directly outside the building

(2) Stairways

(3) Ramps

(4) Horizontal exits

(5) Fire tower

14.4.4.3 All required exits that serve as egress from hospital or infirmary sections shall be not less than 2 m (6.5 ft) in clear width including patient bedroom doors to permit transportation of patients on beds, litters, or mattresses. The minimum width of corridors serving patients bedrooms in buildings shall be 2.4 m (8 ft). For detailed information on recommendations for buildings and facilities for the physically handicapped, reference may be made to good practice.

14.4.4.4 Elevators constitute a desirable supplementary facility, but are not counted as required exits. Patient lifts shall also be provided with enough room for transporting a stretcher trolley.

14.4.5 Additional Requirements

14.4.5.1 No combustible material of any kind shall be stored or used in any building or section thereof, except as necessary to normal occupancy and use of the building.

14.4.5.2 Bare minimum quantities of flammable material such as chloroform, ethyl alcohol, spirit, etc. shall be allowed to be stored and handled. The handling of such liquids shall not be permitted by un-authorized persons. Bulk storage of these items, will be governed by relevant rules and safe practices.

14.4.5.3 No building constructed in whole or in part of combustible materials shall be used to confine inmates in cells or sleeping quarters, unless automatic sprinkler protection is provided.

14.4.5.4 Any area exceeding 500 m^2 (5382 ft^2) shall be divided into compartments by fire resistant walls.

14.5 Residential Board and Care Occupancies

14.5.1 Application. New and existing residential board and care occupancies shall comply with Section 14.5 and NFPA 101 or any approved code/standard.

14.5.2 Operating Features

14.5.2.1 Emergency Action Plan

14.5.2.1.1 The administration of every residential board and care facility shall have, in effect and available to all supervisory personnel, written copies of a plan for protecting all persons in the event of fire, for keeping persons in place, for evacuating persons to areas of refuge, and for evacuating persons from the building when necessary.

14.5.2.1.2 The emergency action plan shall include special staff response, including the fire protection procedures needed to ensure the safety of any resident, and shall be amended or revised whenever any resident with unusual needs is admitted to the home.

14.5.2.1.3 All employees shall be periodically instructed and kept informed with respect to their duties and responsibilities under the plan, and such instruction shall be reviewed by the staff not less than every 3 months.

14.5.2.2 Resident Training

14.5.2.2.1 All residents participating in the emergency action plan shall be trained in the proper actions to be taken in the event of fire.

14.5.2.2.2 The training required by Section 14.5.2.2.1 shall include actions to be taken if the primary escape route is blocked.

14.5.2.2.3 If a resident is given rehabilitation or habilitation training, training in fire prevention and the actions to be taken in the event of a fire shall be a part of the training program.

14.5.2.2.4 Residents shall be trained to assist each other in case of fire to the extent that their physical and mental abilities permit them to do so without additional personal risk.

14.5.2.3 Emergency Egress and Relocation Drills. Emergency egress and relocation drills shall be conducted in accordance with Sections 14.5.2.3.1 through 14.5.2.3.6.

14.5.2.3.1 Emergency egress and relocation drills shall be conducted not less than six times per year on a bimonthly basis, with not less than two drills conducted during the night when residents are sleeping, as modified by Sections 14.5.2.3.5 and 14.5.2.3.6.

14.5.2.3.2 The emergency drills shall be permitted to be announced to the residents in advance.

14.5.2.3.3 The drills shall involve the actual evacuation of all residents to an assembly point, as specified in the emergency action plan, and shall provide residents with experience in egressing through all exits and means of escape required by these Provisions.

14.5.2.3.4 Exits and means of escape not used in any drill shall not be credited in meeting the requirements of these Provisions for board and care facilities.

14.5.2.3.5 Actual exiting from windows shall not be required to comply with Section 14.5.2.3; opening the window and signaling for help shall be an acceptable alternative.

14.5.2.3.6 Residents who cannot meaningfully assist in their own evacuation or who have special health problems shall not be required to actively participate in the drill. Section 14.4.2 shall apply in such instances.

14.5.2.4 Smoking

14.5.2.4.1 Smoking regulations shall be adopted by the administration of board and care occupancies.

14.5.2.4.2 Where smoking is permitted, noncombustible safety-type ashtrays or receptacles shall be provided in convenient locations.

14.5.2.5 Furnishings, Bedding, and Decorations

14.5.2.5.1 New draperies, curtains, and other similar loosely hanging furnishings and decorations in board and care facilities shall comply with Sections 14.5.2.5.1.1 and 14.5.2.5.1.2.

14.5.2.5.1.1 New draperies, curtains, and other similar loosely hanging furnishings and decorations in board and care facilities shall be in accordance with the provisions of Section 8.4, unless otherwise permitted by Section 14.5.2.5.1.2.

14.5.2.5.1.2 In other than common areas, new draperies, curtains, and other similar loosely hanging furnishings and decorations shall not be required to comply with Section 14.5.2.5.1.1 where the building is protected throughout by an approved automatic sprinkler system.

14.5.2.5.2 New upholstered furniture within board and care facilities shall comply with Section 14.5.2.5.2.1 or 14.5.2.5.2.2.

14.5.2.5.2.1 New upholstered furniture shall be tested in accordance NFPA 260 or any approved code/standard.

14.5.2.5.2.2 Upholstered furniture belonging to residents in sleeping rooms shall not be required to be tested, provided that a smoke alarm is installed in such rooms; battery-powered single-station smoke alarms shall be permitted in such rooms.

14.5.2.5.2.3 Newly introduced mattresses within board and care facilities shall comply with Section 14.5.2.5.2.3.1 or 14.5.2.5.2.3.2.

14.5.2.5.2.3.1 Newly introduced mattresses shall be tested in accordance with the provisions of ASTM E 1537 and ASTM E 1590 or any approved code/standard.

14.5.2.5.2.3.2 Mattresses belonging to residents in sleeping rooms shall not be required to be tested, provided that a smoke alarm is installed in such rooms; battery-powered single-station smoke alarms shall be permitted in such rooms.

14.5.2.5.3 No stove or combustion heater shall be located to block escape in case of fire caused by the malfunction of the stove or heater.

14.5.2.5.4 Unvented fuel-fired heaters shall not be used in any residential board and care facility.

14.5.3 Interior Finish

14.5.3.1 General. Interior finish shall be in accordance with Section 8.4

14.5.3.2 New Interior Wall and Ceiling Finish. New interior wall and ceiling finish materials complying with Section 8.4 shall be in accordance with the following:

(1) Exit enclosures – Class A

(2) Lobbies and corridors – Class B

(3) Rooms and enclosed spaces – Class B

14.5.3.3 Existing Interior Wall and Ceiling Finish. Existing interior wall and ceiling finish materials complying with Section 8.4 shall be as follows:

(1) Class A or Class B in facilities other than those having prompt evacuation capability

(2) Class A, Class B, or Class C in facilities having prompt evacuation capability

14.5.3.4 Interior Floor Finish

14.5.3.4.1 New interior floor finish shall comply with Section 8.4.

14.5.3.4.2 New interior floor finish shall comply with Section 8.4.7.1 or 8.4.7.2, as applicable.

14.5.3.4.3 Existing Interior Floor Finish. Existing interior floor finish, other than approved existing floor coverings, shall be Class I or Class II in corridors or exits.

14.5.3.5 Apartment Buildings Housing Board and Care Occupancies

14.5.3.5.1 New Interior Finish

14.5.3.5.1.1 The requirements of Section 14.9.3 shall apply only to the parts of means of egress serving the apartment(s) used as a residential board and care occupancy, as modified by Section 14.5.3.5.1.2.

14.5.3.5.1.2 If a new board and care occupancy is created in an existing apartment building, the requirements of Section 31.3.3 of NFPA 101 or any approved code/standard shall apply to the parts of the means of egress serving the apartment(s) used as a residential board and care occupancy.

14.5.3.5.2 Existing Interior Finish. The requirements of Section 14.9.3 shall apply only to the parts of means of egress serving the apartment(s) used as a residential board and care occupancy.

14.6 Detention and Correctional Occupancies

14.6.1 Application. In addition to the requirements specified elsewhere in these Provisions, new and existing detention and correctional occupancies shall comply with the provisions of Section 14.6 as added or modified.

14.6.2 Operating Features

14.6.2.1 Attendants, Evacuation Plan, Fire Drills

14.6.2.1.1 Detention and correctional facilities, or those portions of facilities having such occupancy, shall be provided with 24-hour staffing, and the following requirements also shall apply:

(1) Staff shall be within three floors or a 300 ft (91 m) horizontal distance of the access door of each resident housing area/room.

(2) The arrangement shall be such that the staff involved starts the release of locks necessary for emergency evacuation or rescue and initiates other necessary emergency actions within 2 minutes of alarm.

14.6.2.1.2 Provisions shall be made so that residents shall be able to notify staff of an emergency.

14.6.2.1.3 The administration of every detention or correctional facility shall have, in effect and available to all supervisory personnel, written copies of a plan for the protection of all persons in the event of fire, for their evacuation to areas of refuge, and for evacuation from the building when necessary.

14.6.2.1.4 All employees shall be instructed and drilled with respect to their duties under the plan.

14.6.2.1.5 Employees of detention and correctional occupancies shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.

14.6.2.1.6 The training specified in Section 14.5.2.1.4 shall be provided to new staff promptly upon commencement of duty.

14.6.2.1.7 Refresher training shall be provided to existing staff at not less than annual intervals.

14.6.2.2 Combustible Personal Property. Books, clothing, and other combustible personal property allowed in sleeping rooms shall be stored in closable metal lockers or an approved fire resistant container.

14.6.2.3 Heat-Producing Appliances. Heat producing appliances, such as toasters and hot plates, and use of electrical power within a sleeping room shall be prohibited.

14.6.2.4 Furnishings, Bedding, and Decorations

14.6.2.4.1 Newly introduced upholstered furniture, mattresses, draperies and curtains, including privacy curtains, in detention and correctional occupancies shall not be highly combustible.

14.6.2.4.2 Combustible decorations shall be prohibited unless flame-retardant.

14.6.2.4.3 Wastebaskets and waste containers shall be of noncombustible or other approved materials.

14.6.2.5 Keys. All keys necessary for unlocking doors installed in a means of egress shall be individually identified by both touch and sight.

14.6.2.6 Doors and door hardware in means of egress shall be inspected monthly by an appropriately trained person. The inspection shall be documented.

14.6.2.7 Portable Space-Heating Devices. Portable space heating devices shall be prohibited in all health care occupancies except in non-sleeping staff and employee areas.

14.6.3 Interior Finish

14.6.3.1 General. Interior wall, ceiling and floor finish shall be in accordance with Section 8.4.

14.6.3.2 Corridors, Lobbies, and Enclosed Stairways. New and existing interior wall and ceiling finish materials shall be Class A or Class B in all corridors, lobbies and enclosed stairways.

14.6.3.3 New interior floor finish in exit enclosures and exit access corridors shall be not less than Class II.

14.6.3.4 Existing interior floor finish in exit enclosures and exit access corridors shall be permitted to remain in use, unless it is a severe hazard for life safety.

14.7 Residential Board and Care Occupancies

14.7.1 Application. In addition to the requirements specified elsewhere in these Provisions, new and existing residential board and care occupancies shall comply with the provisions of Section 14.7 as added or modified.

14.7.2 Operating Features

14.7.2.1 Emergency Action Plan

14.7.2.1.1 The administration of every residential board and care facility shall have, in effect and available to all supervisory personnel, written copies of a plan for protecting all persons in the event of fire, for keeping persons in place, for evacuating persons to areas of refuge, and for evacuating persons from the building when necessary.

14.7.2.1.2 The emergency action plan shall include special staff response, including the fire protection procedures needed to ensure the safety of any resident, and shall be amended or vised whenever any resident with unusual needs is admitted to the home.

14.7.2.1.3 All employees shall be periodically instructed and kept informed with respect to their duties and responsibilities under the plan, and such instruction shall be reviewed by the staff not less than every 6 months.

14.7.2.2 Resident Training

14.7.2.2.1 All residents participating in the emergency action plan shall be trained in the proper actions to be taken in the event of fire.

14.7.2.2.2 The training required by Section 14.7.2.2.1 shall include actions to be taken if the primary escape route is blocked.

14.7.2.2.3 If a resident is given rehabilitation or habilitation training, training in fire prevention and the actions to be taken in the event of a fire shall be a part of the training program.

14.7.2.2.4 Residents shall be trained to assist each other in case of fire to the extent that their physical and mental abilities permit them to do so without additional personal risk.

14.7.2.3 Emergency Egress and Relocation Drills. Emergency egress and relocation drills shall be conducted in accordance with Sections 14.7.2.3.1 through 14.7.2.3.6.

14.7.2.3.1 Emergency egress and relocation drills shall be conducted quarterly, with not less than two drills conducted during the night when residents are sleeping, as modified by Sections 14.7.2.3.5 and 14.7.2.3.6.

14.7.2.3.2 The emergency drills shall be permitted to be announced to the residents in advance.

14.7.2.3.3 The drills shall involve the actual evacuation of all residents to an assembly point, as specified in the emergency action plan, and shall provide residents with experience in egressing through all exits and means of escape required by these Provisions.

14.7.2.3.4 Exits and means of escape not used in any drill shall not be credited in meeting the requirements of these Provisions for board and care facilities.

14.7.2.3.5 Actual exiting from windows shall not be required to comply with Section 14.7.2.3; opening the window and signaling for help shall be an acceptable alternative.

14.7.2.3.6 Residents who cannot meaningfully assist in their own evacuation or who have special health problems shall not be required to actively participate in the drill. Section 14.4.2 shall apply in such instances.

14.7.2.4 Smoking

14.7.2.4.1 Smoking regulations shall be adopted by the administration of board and care occupancies.

14.7.2.4.2 Where smoking is permitted, noncombustible safety-type ashtrays or receptacles shall be provided in convenient locations.

14.7.2.5 Furnishings, Bedding, and Decorations. New draperies, curtains, and other similar loosely hanging furnishings, decorations, upholstered furniture and mattresses in board and care facilities shall not be of highly combustible nature.

14.7.3 Interior Finish

14.7.3.1 Small Facilities

14.7.3.1.1 General. Interior finish shall be in accordance with Section 8.4.

14.7.3.1.2 New Interior Wall and Ceiling Finish. New interior wall and ceiling finish materials shall be Class A, Class B, or Class C.

14.7.3.1.3 Existing Interior Wall and Ceiling Finish. Existing interior wall and ceiling finish materials complying with Section 8.4 shall be Class A, Class B, or Class C.

14.7.3.1.4 Interior Floor Finish.

14.7.3.1.4.1 New interior floor finish shall comply with Section 8.4.

14.7.3.1.4.2 Existing Interior Floor Finish. Existing interior floor finish materials shall be allowed to remain in use, unless these present severe fire safety hazard.

14.8 Hotels and Dormitories

14.8.1 Application. In addition to the requirements specified elsewhere in these Provisions, new and existing hotels and dormitories shall comply with the provisions of Section 14.8 as added or modified.

14.8.2 Operating Features

14.8.2.1 Hotel Emergency Organization

14.8.2.1.1 Employees of hotels shall be instructed and drilled in the duties they are to perform in the event of fire.

14.8.2.1.2 Drills shall be held at quarterly intervals and shall cover such points as the operation and maintenance of the fire safety systems (including but not limited to fire alarms and detection systems, fire pumps, fire extinguishers, sprinklers systems, available first aid fire appliances), the testing of devices to alert guests, and a study of instructions for emergency duties.

14.8.2.2 Emergency Duties. Upon discovery of a fire, employees shall carry out all of the following duties:

(1) Activation of the facility fire protection signaling system, if provided

(2) Notification of the public fire department

(3) Other action as previously instructed

14.8.2.3 Drills in Dormitories

14.8.2.3.1 Emergency egress and relocation drills in accordance with Section 6.5 shall be held quarterly. Drills shall be conducted during peak occupancy periods and all persons shall participate.

14.8.2.3.2 In dormitories which are not occupied round the year, one additional **e**mergency egress and relocation drills shall be held within 15 days when residents re-occupy it or new residents arrive.

14.8.2.4 Emergency Instructions for Residents or Guests

14.8.2.4.1 A floor diagram reflecting the actual floor arrangement, exit locations, and room identification shall be posted on appropriate locations, and in every guest room in hotels and in every resident room in dormitories.

14.8.2.4.2 Fire safety information shall be provided to residents/guests, at the time of check in to hotel guests and on the day when a resident joins a dormitory, allow residents/guests to make the decision to evacuate to the outside, to evacuate to an area of refuge, to remain in place, or to employ any combination of the three options.

14.8.2.4.3 Emergency action plans in accordance with Section 10.8 shall be available.

14.8.2.5 Contents and Furnishings. Newly introduced upholstered furniture, mattresses, draperies, curtains, and other similar loosely hanging furnishings and decorations of an explosive or highly flammable character shall not be used.

14.8.2.6 Fuel-Fired Heaters. Unvented fuel-fired heaters, shall not be used.

14.8.3 Interior Finish

14.8.3.1 General. Interior wall, ceiling and floor finish shall be in accordance with Section 8.4 **14.8.3.2** Interior wall and ceiling finish materials shall be permitted as follows:

(1) Exit enclosures

(a) New occupancies – Class A

(b) Existing occupancies – Class A or Class B

(2) Lobbies and corridors – Class A or Class B

(3) Other spaces – Class A, Class B, or Class C

14.8.3.3 New interior floor finish in exit enclosures and exit access corridors shall be not less than Class II.

14.8.3.4 Existing interior floor finish in exit enclosures and exit access corridors shall be permitted to remain in use, unless it is a severe hazard for life safety.

14.9 Apartment Buildings

14.9.1 Application and Compliance

14.9.1.1 In addition to the requirements specified elsewhere in these Provisions, new and existing apartment building shall comply with the provisions of Section 14.9 as added or modified.

14.9.1.2 Owner is responsible that building is constructed in accordance with these Provision and required means of egress and fire detection and alarm systems are provided.

14.9.1.3 Section 14.9 is not applicable to apartment buildings less than 30 m (100 ft).

14.9.2 Operating Features

14.9.2.1 Emergency instructions, shall be provided to current occupants of each dwelling unit annually and to a new occupant within first 7 days of occupying of dwelling unit, to indicate the location of alarms, egress paths, and actions to be taken, both in response to a fire in the dwelling unit and in response to the sounding of the alarm system.

14.9.3 Interior Finish

14.9.3.1 General. Interior finish shall be in accordance with Section 8.4

14.9.3.2 New and Existing Interior Wall and Ceiling Finish. New interior wall and ceiling finish materials complying with Section 8.4 shall be permitted as follows:

(1) Exit enclosures – Class A

(2) Lobbies and corridors – Class A or Class B

(3) Other spaces – Class A, Class B, or Class C

14.9.3.3 New Interior Floor Finish

14.9.3.3.1 New interior floor finish shall comply with Section 8.4.

14.9.3.3.2 New interior floor finish in exit enclosures and exit access corridors and spaces not separated from them by walls complying with Section 30.3.6 of NFPA 101 or any approved code/standard shall be not less than Class II.

14.9.3.3.3 New interior floor finish shall comply with Section 8.4.7.1 or 8.4.7.2, as applicable.

14.9.3.4 Existing Interior Floor Finish. In buildings utilizing Option 1 or Option 2, as defined in Section 31.1.1.1 of NFPA 101 or any approved code/standard, newly installed interior floor finish in exits and exit access corridors shall be not less than Class II in accordance with Section 8.4.7.

14.9.4 Contents and Furnishings

14.9.4.1 Contents and furnishings shall not be required to comply with Section 8.5.

14.9.4.2 Furnishings or decorations of an explosive or highly flammable character shall not be used outside of dwelling units.

14.9.4.3 Fire-retardant coatings shall be maintained to retain the effectiveness of the treatment under service conditions encountered in actual use.

14.10 Lodging or Rooming Houses

14.10.1 Application. In addition to the requirements specified elsewhere in these Provisions, new and existing lodging or room houses shall comply with the provisions of Section 14.10 as added or modified.

14.10.2 Fuel-Fired Heaters. Unvented fuel-fired heaters, other than gas space heaters, shall not be used.

14.10.3 Interior Wall, Ceiling and Floor Finish

14.10.3.1 Interior finish shall be in accordance with Section 8.4.

14.10.3.2 Interior wall and ceiling finish materials shall be Class A, Class B, or Class C.

14.10.3.3 Newly installed interior floor finish shall be Class I.

14.10.3.4 Existing interior floor finish shall be permitted to remain in use.

14.10.4 Curtains, draperies, furnishings or decorations of an explosive or highly flammable character shall not be used.

14.10.5 Emergency Instructions for Residents. Emergency instructions, shall be provided to residents at the time of check in, to indicate the location of alarms, egress paths, and actions to be taken, both in response to a fire in the dwelling unit and in response to the sounding of the alarm system.

14.11 One- and Two-Family Dwellings and Manufactured Housing

14.11.1 Application. In addition to the requirements specified elsewhere in these Provisions, new and existing one- and two-family dwellings and manufactured housing shall comply with the provisions of Section 14.11 as added or modified.

14.11.2 Interior Wall, Ceiling and Floor Finish

14.11.2.1 General. Interior wall, ceiling and floor finish shall be in accordance with Section 8.4.

14.11.2.2 Interior Wall and Ceiling Finish. New interior wall and ceiling finish shall be Class A, Class B, or Class C.

14.11.2.3 Existing interior wall, ceiling and floor finish in exit enclosures and exit access corridors shall be permitted to remain in use, unless it is a severe hazard for life safety.

14.11.3 Manufactured Housing. New manufactured housing shall comply with Section 14.11 and NFPA 501 or any approved code/standard.

14.12 Mercantile Occupancies

14.12.1 Application. In addition to the requirements specified elsewhere in these Provisions, new and existing mercantile occupancies shall comply with the provisions of Section 14.12 as added or modified.

14.12.2 Operating Features

14.12.2.1 Emergency Plans. Emergency plans complying with Section 6.8 shall be provided in high-rise buildings.

14.12.2.2 Drills. In every Class A or Class B mercantile occupancy, employees shall be trained twice a year in accordance with Section 6.5.

14.12.2.3 Extinguisher Training. Employees of mercantile occupancies shall be periodically instructed in the use of portable fire extinguishers.

14.12.2.4 Food Service Operations. Food service operations shall comply with Section 14.1.5.2.

14.12.3 Interior Wall, Ceiling and Floor Finish

14.12.3.1 General. Interior finish shall be in accordance with Section 8.4

14.12.3.2 New interior wall and ceiling finish materials complying with Section 8.4 shall be Class A, Class B, or Class C.

14.12.3.3 New interior floor finish in exit enclosures shall be Class I or Class II.

14.12.3.4 Existing interior wall, ceiling and floor finish materials shall be allowed to remain in use, unless these present severe fire safety hazard.

14.12.4 Miscellaneous Requirements

14.12.4.1 Open-air mercantile operations, such as open air markets, gasoline filling stations, roadside stands for the sale of a farm produce and other outdoor mercantile operations shall be so arranged and conducted as to maintain free and unobstructed ways of travel at all times to permit prompt escape from any point of danger in case of fire.

14.12.4.2 There shall be no dead-ends in which persons might be trapped due to display stands, adjoining buildings, fences, vehicles or other obstructions.

14.12.4.3 If mercantile operations are conducted in roofed-over areas, these shall be treated as mercantile buildings, provided canopies over individual small stands to protect merchandise from the weather shall not be constructed to constitute buildings for the purpose of these provisions.

14.13 Business Occupancies

14.13.1 Application. In addition to the requirements specified elsewhere in these Provisions, new and existing business occupancies shall comply with the provisions of Section 14.13 as added or modified.

14.13.2 Operating Features

14.13.2.1 Emergency Plans. Emergency plans complying with Section 6.8 shall be provided in high-rise buildings.

14.13.2.2 Drills. In all business occupancy buildings occupied by more than 500 persons, or by more than 100 persons above or below the street level, employees and supervisory personnel shall be instructed periodically in accordance with Section 6.5 and shall hold drills twice a year.

14.13.2.3 Extinguisher Training. Designated employees of business occupancies shall be periodically instructed in the use of portable fire extinguishers.

14.13.2.4 Food Service Operations. Food service operations shall comply with Section 14.1.5.2.

14.14.3 Interior Finish

14.14.3.1 General. Interior finish shall be in accordance with Section 8.4.

14.14.3.2 Interior Wall and Ceiling Finish

14.14.3.2.1 Interior wall and ceiling finish material shall be Class A or Class B in exits and in exit access corridors.

14.14.3.2.2 Interior wall and ceiling finishes shall be Class A, Class B, or Class C in areas other than those specified in Section 14.14.3.2.1.

14.14.3.3 Interior Floor Finish

14.14.3.3.1 New interior floor finish shall comply with Section 8.4.

14.14.3.3.2 New interior floor finish in exit enclosures shall be Class I or Class II.

14.14.3.3.3 Existing Interior Floor Finish. Existing interior floor finish materials shall be allowed to remain in use, unless these present severe fire safety hazard.

14.15 Industrial Occupancies

14.15.1 Application. In addition to the requirements specified elsewhere in these Provisions, new and existing industrial occupancies shall comply with the provisions of Section 14.15 as added or modified.

14.15.2 Permits. Permits, where required, shall comply with Section 1.12.

14.15.3 Interior Finish

14.15.3.1 General. Interior finish shall be in accordance with Section 8.4.

14.15.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials shall be Class A, Class B or Class C in operating areas and exit enclosures.

14.15.3.3 Interior Floor Finish

14.15.3.3.1 Interior floor finish in exit enclosures and in exit access corridors shall be Class I or Class II.

14.15.3.3.2 Existing interior floor finish materials shall be allowed to remain in use, unless these present severe fire safety hazard.

14.15.4 Operating Features

14.15.4.1 Emergency Plans. Emergency plans complying with Section 6.8 shall be provided.

14.15.4.2 Drills. Employees and supervisory personnel shall be instructed periodically in accordance with Section 6.5 and shall hold drills twice a year.

14.15.4.3 Extinguisher Training. Employees shall be periodically instructed in the use of portable fire extinguishers.

14.15.4.4 Food Service Operations. Food service operations shall comply with Section 14.1.5.2.

14.16 Storage Occupancies

14.16.1 Application. In addition to the requirements specified elsewhere in these Provisions, new and existing storage occupancies shall comply with the provisions of Section 14.16 as added or modified.

14.16.2 Permits. Permits, where required, shall comply with Section 1.12.

14.16.3 Interior Finish

14.16.3.1 General. Interior finish shall be in accordance with Section 8.4.

14.16.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials shall be Class A, Class B, or Class C in storage areas and exit enclosures.

14.16.3.3 Interior Floor Finish

14.16.3.3.1 Interior floor finish in exit enclosures and in exit access corridors shall be Class I or Class II.

14.16.3.3.2 Existing interior floor finish materials shall be allowed to remain in use, unless these present severe fire safety hazard.

14.16.4 Storage, Arrangement, Protection, and Quantities of Hazardous Commodities. The storage, arrangement, protection, and quantities of hazardous commodities shall be in accordance with the applicable provisions of NFPA 13, NFPA 30, NFPA 30B and NFPA 400 or any other approved code/standard.

14.16.5 Bulk Storage Elevators. Bulk storage elevators shall comply with Section 14.16.5 and NFPA 61 or any approved code/standard.

14.16.5.1 Application. The requirements of Section 14.16.5 shall apply to all of the following:

(1) All facilities that receive, handle, process, dry, blend, use, mill, package, store, or ship dry agricultural bulk materials, their by-products, or dusts that include grains, oilseeds, agricultural seeds, legumes, sugar, flour, spices, feeds, and other related materials

(2) All facilities designed for manufacturing and handling starch, including drying, grinding, conveying, processing, packaging, and storing dry or modified starch, and dry products and dusts generated from these processes

(3) Those seed preparation and meal-handling systems of oil seed processing plants not covered by NFPA 36 or any other approved code/standard.

14.16.5.2 Section 14.16.5 shall not apply to oil seed extraction plants that are covered by NFPA 36 or any approved code/standard.

14.16.5.3 Applicability

14.16.5.3.1 Unless otherwise noted, the provisions of Section 14.16.5 on bulk storage elevators shall not be applied to facilities, equipment, structures, or installations that were existing or approved for construction or installation prior to the effective date of these Provisions, except in those cases where the existing situation involves a distinct hazard to life or adjacent property.

14.16.6 Record Storage

14.16.6.1 Records protection equipment, facilities, and records-handling techniques that provide protection from the hazards of fire shall comply with Section 14.16.6 and NFPA 232 or any approved code/standard.

14.16.6.2 Because of the volume of records, Section 14.16.6.1 shall not cover large archives or records storage buildings.

14.16.7 High-Piled Storage

14.16.7.1 Application. Buildings containing high-piled storage shall comply with Chapter 9, and Section 14.16.7.

14.16.7.2 Permits. Permits, where required, shall comply with Section 1.12.

14.16.7.3 Fire Department Hose Connections

14.16.7.3.1 When any portion of the high-piled combustible storage area is greater than 200 ft (61 m) from a fire department access door, Class I standpipe outlets connected to a system sized to deliver 250 gpm (946.4 L/min) at the most hydraulically remote outlet shall be provided in accordance with Section 14.16.7.3.

14.16.7.3.2 The outlet shall be permitted to be supplied from the sprinkler system and shall be hydraulically calculated.

14.16.7.3.3 Standpipe outlets shall be provided at each of the following locations:

(1) In each exit passageway at the entrance from the storage areas into the passageway

(2) At each intermediate landing between floor levels in every required exit stairway serving the storage area

(3) At exterior entrances into the storage

14.17 Special Structures and High-Rise Buildings

14.17.1 Application

14.17.1.1 New and existing special structures and high-rise buildings shall comply with NFPA 101 or any other approved code/standard.

14.18 Historic Buildings and Cultural Resources

14.18.1 Historic buildings shall comply with these Provisions or with the provisions of NFPA 914 or any other approved code/standard.

14.18.2 Buildings that store or display cultural resources, including museum or library collections, or spaces within other buildings used for such culturally significant purposes, shall comply with these Provisions or with the provisions of NFPA 909 or any other approved code/standard.

14.18.3 The Provisions relating to the construction, repair, alteration, enlargement, restoration, and moving of buildings or structures shall not be mandatory for existing buildings or structures identified and classified by the state or local government authority as historic buildings.

Chapter 15 Grandstands and Bleachers, Folding and Telescopic Seating, Tents, and Membrane Structures

15.1 General

15.1.1 The construction, location, protection, and maintenance of grandstands and bleachers, folding and telescopic seating, tents, and membrane structures shall meet the requirements of this chapter.

15.1.2 Permits. Permits, where required, shall comply with Section 1.12.

15.1.3 Means of Egress

15.1.3.1 Means of egress shall comply with the requirements of Chapter 10.

15.1.3.2 No guy wire or guy rope shall cross any means of egress at a height of less than 7 ft (2.1 m).

15.1.3.3 Tent stakes adjacent to any means of egress from any tent open to the public shall be railed off, capped, or covered so as not to present a hazard to the public.

15.1.3.4 New and existing facilities shall comply with the means of egress requirements for the applicable occupancies.

15.1.4 Fire Hazards

15.1.4.1 The finished ground level enclosed by the structure, and the surrounding finished ground level not less than 10 ft (3050 mm) outside of the structure, shall be cleared of all flammable or combustible material and vegetation.

15.1.4.2 Smoking shall not be permitted in any temporary membrane structure.

15.1.4.3 Hay, straw, shavings, or similar combustible materials that have not been treated to make them flame retardant shall not be permitted within any structure used as assembly occupancy. *Exception: Animal bedding and fodders.*

15.1.4.4 Open Flame Devices and Pyrotechnics. Use of open flame devices and pyrotechnics shall comply with Section 14.1.5.3.

15.1.5 Extinguishment Requirements

15.1.5.1 Portable fire extinguishers shall be installed in assembly occupancies unless otherwise permitted by one of the following:

(1) The requirement of Section 15.1.5.1 shall not apply to seating areas.

(2) The requirement of Section 15.1.5.1 shall not apply to floor areas used for contests, performances, or entertainment.

(3) The requirement of Section 15.1.5.1 shall not apply to outside assembly occupancy areas.

(4) Portable extinguishers shall be permitted to be located in secure locations accessible to staff.

15.1.5.2 Employees shall be trained to operate fire extinguishing equipment.

15.1.6 Detection, Alarm, and Communications Systems. Detection, alarm, and communications systems shall comply with Section 9.7 where required by Section 9.7.2.1 or 9.7.2.2.

15.1.7 Fire Detail. See Section 1.7.17 for fire detail requirements.

15.1.8 Electrical Installations

15.1.8.1 Electrical Systems. Electrical wiring and equipment shall be in accordance with Section 7.1, unless such installations are approved existing installations, which shall be permitted to be continued in service.

15.1.8.2 The electrical system shall be installed, maintained, and operated in a safe and professional manner. When in use, portable electrical systems shall be inspected daily by a qualified person representing the owner, and any defects found shall be corrected before the public is admitted.

15.1.8.3 The electrical system and equipment shall be isolated from the public by proper elevation or guarding, and all electrical fuses and switches shall be enclosed in approved enclosures. Cables on the ground in areas traversed by the public shall be placed in trenches or protected by approved covers.

15.1.9 Heating Devices

15.1.9.1 Fired Heaters

15.1.9.1.1 Heating devices shall comply with Sections 7.2 and 7.5.

15.1.9.1.2 Only labeled heating devices shall be used.

15.1.9.1.3 Air-Conditioning, Heating, Ventilating Ductwork, and Related Equipment. Air-conditioning, heating, ventilating ductwork, and related equipment shall be in accordance with Section 7.2.1, as applicable, unless such installations are approved existing installations, which shall be permitted to be continued in service.

15.1.9.1.4 Ventilating or Heat-Producing Equipment. Ventilating or heat-producing equipment shall be in accordance with Section 7.2.2, as applicable, unless such installations are approved existing installations, which shall be permitted to be continued in service.

15.1.9.1.5 Containers for liquefied petroleum gases shall be installed not less than 5 ft (1.5 m) from any tent or temporary membrane structure.

15.1.9.1.6 Tanks shall be secured in the upright position and protected from vehicular traffic.

15.1.9.2 Electric Heaters

15.1.9.2.1 Electric heaters shall comply with Section 7.5.

15.1.9.2.2 Only labeled heaters shall be permitted.

15.1.9.2.3 Electric heaters, their placement, and their installation shall be approved by AHJ.

15.1.9.2.4 Heaters shall be connected to electricity by electric cable that is suitable for outside use and is of sufficient size to handle the electrical load.

15.1.10 Generators

15.1.10.1 Generators and other internal combustion power sources shall be separated from temporary membrane structures and tents by a minimum of 5 ft (1.5 m) and shall be protected from contact by fencing, enclosure, or other approved means.

15.1.10.2 Fueling. Fuel tanks shall be of adequate capacity to permit uninterrupted operation during normal operating hours. Refueling shall be conducted only when not in use.

15.2 Tents and Grandstands

15.2.1 General

15.2.1.1 Tents shall be permitted only on a temporary basis.

15.2.1.2 Tents shall be erected to cover not more than 75 percent of the premises.

15.2.3 Location and Spacing

15.2.3.1 There shall be a minimum of 10 ft (3050 mm) between stake lines.

15.2.3.2 Adjacent tents shall be spaced to provide an area to be used as a means of emergency egress. Where 10 ft (3050 mm) between stake lines does not meet the requirements for means of egress, the distance necessary for means of egress shall govern.

15.2.3.3 Tents not occupied by the public and not used for the storage of combustible material shall be permitted to be erected less than 10 ft (3050 mm) from other structures where AHJ deems such close spacing to be safe from hazard to the public.

15.2.3.4 Tents, each not exceeding 1200 ft^2 (112 m^2) in ground area and located in fairgrounds or similar open spaces, shall not be required to be separated from each other, provided that safety precautions meet the approval of AHJ.

15.2.3.5 The placement of tents relative to other structures shall be at the discretion of AHJ, with consideration given to occupancy, use, opening, exposure, and other similar factors.

15.2.4 Fire Hazards

15.2.4.1 The finished ground level enclosed by any tent, and the finished ground level for a reasonable distance, but for not less than 10 ft (3050 mm) outside of such a tent, shall be cleared of all flammable or combustible material or vegetation that is not used for necessary support equipment. The clearing work shall be accomplished to the satisfaction of AHJ prior to the erection of such a tent. The premises shall be kept free from such flammable or combustible materials during the period for which the premises are used by the public.

15.2.4.2 Smoking

15.2.4.2.1 Smoking shall not be permitted in any tent.

15.2.4.2.2 In rooms or areas where smoking is prohibited, plainly visible signs shall be posted that read as **NO SMOKING**

15.2.5 Fire-Extinguishing Equipment. Portable fire extinguishing equipment of approved types shall be furnished and maintained in tents.

15.3 Grandstands

15.3.1 Special Requirements - Portable Grandstands

15.3.1.1 Portable grandstands shall conform to the requirements of Section 15.3 for grandstands and the requirements of Sections 15.3.1.2 and 15.3.1.3.

15.3.1.2 Portable grandstands shall be self-contained and shall have within them all necessary parts to withstand and restrain all forces that might be developed during human occupancy.

15.3.1.3 Portable grandstand construction shall be skillfully accomplished to produce the strength required by the design.

15.3.2 Spaces Underneath Grandstands. Spaces underneath a grandstand shall be kept free of flammable or combustible materials.

15.3.3 Guards and Railings

15.3.3.1 Railings or guards not less than 42 in. (1065 mm) above the aisle surface or footrest or not less than 36 in. (915 mm) vertically above the center of the seat or seat board surface, whichever is adjacent, shall be provided along those portions of the backs and ends of all

grandstands where the seats are more than 48 in. (1220 mm) above the floor or the finished ground level.

15.3.3.2 The requirement of Section 15.3.3.1 shall not apply where an adjacent wall or fence affords equivalent safeguard.

15.3.3.3 Where the front footrest of any grandstand is more than 24 in. (610 mm) above the floor, railings or guards not less than 33 in. (825 mm) above such footrests shall be provided.

15.3.3.4 The railings required by Section 15.3.3.3 shall be permitted to be not less than 26 in. (660 mm) high in grandstands or where the front row of seats includes backrests.

15.3.3.5 Cross aisles located within the seating area shall be provided with rails not less than 26 in. (660 mm) high along the front edge of the cross aisle.

15.3.3.6 The railings specified by Section 15.3.3.5 shall not be required where the backs of the seats in front of the cross aisle project 24 in. (610 mm) or more above the surface of the cross aisle.

15.3.3.7 Vertical openings between guardrails and footboards or seat boards shall be provided with intermediate construction so that a 4 in. (100 mm) diameter sphere cannot pass through the opening.

15.3.3.8 An opening between the seat board and footboard located more than 30 in. (760 mm) above the finished ground level shall be provided with intermediate construction so that a 4 in. (100 mm) diameter sphere cannot pass through the opening.

15.3.4 Maintenance of Outdoor Grandstands

15.3.4.1 The owner shall provide for not less than annual inspection and required maintenance of each outdoor grandstand to ensure safe conditions.

15.3.4.2 At least biennially, the inspection shall be performed by a professional engineer, registered architect, or individual certified by the manufacturer.

15.3.4.3 The owner shall provide a copy of the inspection report and certification that the inspection required by Section 15.3.4.2 has been performed.

APPENDIX A

SYSTEM RECORD OF COMPLETION

This form is to be completed by the system installation contractor at the time of system acceptance and approval.
It shall be permitted to modify this form as needed to provide a more complete and/or clear record.
Insert N/A in all unused lines.
Attach additional sheets, data, or calculations as necessary to provide a complete record.

Form Completion Date:		**Supplemental Pages Attached:**
1. PROPERTY INFORMATION		
Name of property:		
Address:		
Description of property:		
Name of property representative:		
Address:		
Phone:	Fax:	E-mail:
2. **INSTALLATION, SERVICE, TESTING, AND MONITORING INFORMATION**		
Installation contractor:		
Address:		
Phone:	Fax:	E-mail:
Service organization:		
Address:		
Phone:	Fax:	E-mail:
Testing organization:		
Address:		
Phone:	Fax:	E-mail:
Effective date for test and inspection contract:		
Monitoring organization:		
Address:		
Phone:	Fax:	E-mail:
Account number:	Phone line 1:	Phone line 2:
Means of transmission:		
Entity to which alarms are retransmitted:	Phone:	
3. DOCUMENTATION		
On-site location of the required record documents and site-specific software:		
4. **DESCRIPTION OF SYSTEM OR SERVICE**		
This is a:	□ New system □ Modification to existing system	□ Permit number:
NFPA 72 edition:		
4.1 **Control Unit**		

Manufacturer:	Model number:
4.2 **Software and Firmware**	
Firmware revision number:	
4.3 Alarm Verification	□ This system does not incorporate alarm verification
Number of devices subject to alarm verification: Alarm verification set for seconds	
5. SYSTEM POWER	
5.1 Control Unit	
5.1.1 Primary Power	
Input voltage of control panel:	Control panel amps:
Overcurrent protection: Type:	Amps:
Branch circuit disconnecting means location:	Number:
5.1.2 Secondary Power	
Type of secondary power:	
Location, if remote from the plant:	
Calculated capacity of secondary power to drive the system:	
In standby mode (hours):	In alarm mode (minutes):
5.2 Control Unit	
□ This system does not have power extender panels	
□ Power extender panels are listed/approved on supplementary sheet A	

6. CIRCUITS AND PATHWAYS

Pathway Type Pathway	**Dual Media Pathway**	**Separate**	**Class**	**Survivability Level**
Signaling Line				
Device Power				
Notification Appliance				
Other (specify):				

Initiating Device

7. **REMOTE ANNUNCIATORS**

Type	**Location**

8. INITIATING DEVICES

Type	**Quantity**	**Addressable or Conventional**	**Alarm or Supervisory**	**Sensing Technology**
Manual Pull Stations				
Smoke Detectors				
Duct Smoke Detectors				
Heat Detectors				
Gas Detectors				

Waterflow Switches				
Tamper Switches				

9. NOTIFICATION APPLIANCES

Type Quantity Description

Audible

Visible

Combination Audible and Visible

10. SYSTEM CONTROL FUNCTIONS

	Type	Quantity
Hold-Open Door Releasing Devices		
HVAC Shutdown		
Fire/Smoke Dampers		
Door Unlocking		
Elevator Recall		
Elevator Shunt Trip		

11. INTERCONNECTED SYSTEMS

□ This system does not have interconnected systems.

□ Interconnected systems are listed/approved on supplementary sheet .

12. CERTIFICATION AND APPROVALS

12.1 **System Installation Contractor**

This system as specified herein has been installed according to all NFPA standards cited herein.

Signed:	Printed name:	Date:
Organization:	Title:	Phone:

12.2 System Operational Test

This system as specified herein has tested according to all NFPA standards cited herein.

Signed:	Printed name:	Date:
Organization:	Title:	Phone:

12.3 Acceptance Test

Date and time of acceptance test:

Installing contractor representative:

Testing contractor representative:

Property representative:

AHJ representative:

Figure A.1 System record of completion

APPENDIX B

POWER SYSTEMS SUPPLEMENTARY RECORD OF COMPLETION

This form is a supplement to the System Record of Completion. It includes systems and components specific to power systems that incorporate generators, UPS systems, remote battery systems, or other complex power systems.

This form is to be completed by the system installation contractor at the time of system acceptance and approval.

It shall be permitted to modify this form as needed to provide a more complete and/or clear record.

Insert N/A in all unused lines.

Form Completion Date: _____ Number of Supplemental Pages Attached: _____

1. PROPERTY INFORMATION
Name of property:
Address:
2. SYSTEM POWER
2.1 Control Unit
2.1.1 Primary Power
Input voltage of control panel: Control panel amps:
Over current protection: Type: Amps:
Location (of primary supply panel board):
Disconnecting means location:
2.1.2 Engine-Driven Generator
Location of generator:
Location of fuel storage: Type of fuel:
2.1.3 Uninterruptible Power System
Equipment powered by UPS system:
Location of UPS system:
Calculated capacity of UPS batteries to drive the system components connected to it:
In standby mode (hours): In alarm mode (minutes):
2.1.4 Batteries
Location: Type: Nominal voltage: Amp/hour rating:
Calculated capacity of batteries to drive the system:
In standby mode (hours): In alarm mode (minutes):
2.2 In-Building Fire Emergency Voice Alarm Communications System or Mass Notification System
2.2.1 Primary Power
Input voltage of EVACS or MNS panel: EVACS or MNS panel amps:
Over current protection: Type: Amps:
Location (of primary supply panel board):
Disconnecting means location:

Figure B.1 Power Systems Supplementary Record of Completion

APPENDIX C

NOTIFICATION APPLIANCE POWER PANEL SUPPLEMENTARY RECORD OF COMPLETION

This form is a supplement to the System Record of Completion. It includes a list of types and locations of notification appliance power extender panels.
This form is to be completed by the system installation contractor at the time of system acceptance and approval.
It shall be permitted to modify this form as needed to provide a more complete and/or clear record.
Insert N/A in all unused lines.
Form Completion Date:_____ Number of Supplemental Pages Attached:_____

1. PROPERTY INFORMATION			
Name of property:			
Address:			
2. NOTIFICATION APPLIANCE POWER EXTENDER PANELS			
Make and Model	Location	Area Served	Power Source
See Main System Record of Completion for additional information, certifications, and approvals.			

Figure C.1 Notification Appliance Power Panel Supplementary Record of Completion

APPENDIX D

INTERCONNECTED SYSTEMS SUPPLEMENTARY RECORD OF COMPLETION

This form is a supplement to the System Record of Completion. It includes a list of types and locations of systems that are interconnected to the main system.

This form is to be completed by the system installation contractor at the time of system acceptance and approval.

It shall be permitted to modify this form as needed to provide a more complete and/or clear record.

Insert N/A in all unused lines.

Form Completion Date: _____ Number of Supplemental Pages Attached:_____

1. PROPERTY INFORMATION

Name of property:

Address:

1. PROPERTY INFORMATION		
Name of property:		
Address:		
2. INTERCONNECTED SYSTEMS		
Description	Location	Purpose
See Main System Record of Completion for additional information, certifications, and approvals.		

Figure D.1 Interconnected Systems Supplementary Record of Completion

APPENDIX E

DEVIATIONS FROM ADOPTED CODES AND STANDARDS SUPPLEMENTARY RECORD OF COMPLETION

This form is a supplement to the System Record of Completion. It enables the designer and/or installer to document and justify deviations from accepted codes or standards.
This form is to be completed by the system installation contractor at the time of system acceptance and approval.
It shall be permitted to modify this form as needed to provide a more complete and/or clear record.
Insert N/A in all unused lines.
Form Completion Date:_____ Number of Supplemental Pages Attached:_____

1. **PROPERTY INFORMATION**	
Name of property:	
Address:	
2. DEVIATIONS FROM ADOPTED CODES OR STANDARDS	
Description	Purpose
See Main System Record of Completion for additional information, certifications, and approvals.	

Figure E.1 Deviations from Adopted Codes and Standards Supplementary Record

APPENDIX F

SYSTEM RECORD OF INSPECTION AND TESTING

This form is to be completed by the system inspection and testing contractor at the time of a system test.
It shall be permitted to modify this form as needed to provide a more complete and/or clear record.
Insert N/A in all unused lines.
Attach additional sheets, data, or calculations as necessary to provide a complete record.

Inspection /Test Start Date/Time: _____Inspection /Test Completion Date/Time:_____
Supplemental Form(s) Attached:_____(yes/no)_____

1. PROPERTY INFORMATION
Name of property:
Address:
Description of property:
Name of property representative:
Address:
Phone: Fax: E-mail:
2. Testing and Monitoring Information
Testing organization:
Address:
Phone: Fax: E-mail:
Monitoring organization:
Address:
Phone: Fax: E-mail:
Account number: Phone line 1: Phone line 2:
Means of transmission:
Entity to which alarms are retransmitted: Phone:
3. DOCUMENTATION
Onsite location of the required record documents and site-specific software:
4. DESCRIPTION OF SYSTEM OR SERVICE
4.1 Control Unit
Manufacturer: Model number:
4.2 Software Firmware
Firmware revision number:
4.3 System Power
4.3.1 Primary (Main) Power
Nominal voltage: Amps: Location:
Overcurrent protection type: Amps: Disconnecting means location:
4.3.2 Secondary Power

Type: Location:			
Battery type (if applicable):			
Calculated capacity of batteries to drive the system:			
In standby mode (hours): In alarm mode (minutes):			
5. NOTIFICATIONS MADE PRIOR TO TESTING			
Monitoring organization	Contact:	Time:	
Building management	Contact:	Time:	
Building occupants	Contact:	Time:	
Authority having jurisdiction	Contact:	Time:	
Other, if required	Contact:	Time:	
6. TESTING RESULTS			
6.1 Control Unit and Related Equipment			
Description	**Visual Inspection**	**Functional Test**	**Comments**
Control unit			
Lamps/LEDs/LCDs			
Fuses			
Trouble signals			
Disconnect switches			
Ground-fault monitoring			
Supervision			
Local annunciator			
Remote annunciators			
Remote power panels			
6.2 Secondary Power			
Description	**Visual Inspection**	**Functional Test**	**Comments**
Battery condition			
Load voltage			
Discharge test			
Charger test			
Remote panel batteries			
6.3 Alarm and Supervisory Alarm Initiating Device			
Attach supplementary device test sheets for all initiating devices.			
6.4 Notification Appliances			
Attach supplementary appliance test sheets for all notification appliances.			
6.5 Interface Equipment			
Attach supplementary interface component test sheets for all interface components.			
Circuit Interface / Signaling Line Circuit Interface / Fire Alarm Control Interface			

6.6 Supervising Station Monitoring

Description	Yes	No	Time	Comments
Alarm signal				
Alarm restoration				
Trouble signal				
Trouble restoration				
Supervisory signal				
Supervisory restoration				

6.7 Public Emergency Alarm Reporting System

Description	Yes	No	Time	Comments
Alarm signal				
Alarm restoration				
Trouble signal				
Trouble restoration				
Supervisory signal				
Supervisory restoration				

7. NOTIFICATIONS THAT TESTING IS COMPLETE

Monitoring organization	Contact:	Time:
Building management	Contact:	Time:
Building occupants	Contact:	Time:
Authority having jurisdiction	Contact:	Time:
Other, if required	Contact:	Time:

8. SYSTEM RESTORED TO NORMAL OPERATION

Date: Time:

9. CERTIFICATION

This system as specified herein has been inspected and tested according to NFPA 72, 2013 edition, Chapter 14.

Signed:	Printed name:	Date:
Organization:	Title:	Phone:

Qualifications (refer to 6.5.3):

10. DEFECTS OR MALFUNCTIONS NOT CORRECTED AT CONCLUSION OF SYSTEM INSPECTION

TESTING OR MAINTENANCE		
10.1 Acceptance by Owner or Owner's Representative:		
The undersigned accepted the test report for the system as specified herein:		
Signed:	Printed name:	Date:
Organization:	Title:	Phone:

Figure F.1System Record of Inspection and Testing