Clark County Amendments to the 2024 International Fire Code

Including Various NFPA Standards

Effective July 01, 2026

2024 Clark County Fire Code Ordinance History

Effective Date	Ord Number	Description
01/01/2026	Ord. #5321	Reorganizes Chapter 13.04; revises various chapter 13.04 sections; deletes 2018 IFC and its amendments; adopts the 2024 IFC with Appendices B, C, D, H, P, Q; amends various sections of the IFC, appendices, and referenced standards.
05/06/2026	Ord. #5365	Revises the 2024 Fire Code to correct gaseous quantities in Table 108.2.6(2) and the standpipe fee in Table 108.2.6(5)
07/01/2026	Ord. #5377	Revises the 2024 Fire Code by adding Chapter 42, Single Lane Tunnels.

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CHAPTER 13.04 PROVISIONS

13.04.010 – Short title

13.04.010 – Short title.

This chapter shall be known as the "Fire Code of Clark County" and may be cited as such. Where the designation "International Fire Code" or the abbreviation "IFC" appears in this chapter, it shall be construed as referring to the International Fire Code as adopted in and amended by this chapter.

13.04.020 – Adoption

13.04.020 – Adoption.

(A) That certain document, three copies of which are on file in the office of the County Clerk of Clark County, being marked and designated as the "International Fire Code, 2024 Edition" (referenced herein as the IFC) published by the International Code Council, together with all tables of contents, definitions, articles, tables, indices, examples, referenced standards and the following appendices: Appendix B Fire-Flow Requirements for Buildings; Appendix C Fire Protection Water Supplies and Fire Hydrant Locations and Distribution; Appendix D Civil Improvement Plans; Appendix H Hazardous Materials Management Plan (HMMP) and Hazardous Materials Inventory Statement (HMIS) Instructions; Appendix P Proprietary Supervising Station Facilities, Appendix Q Fire Protection Systems Impairments and Systems out of Service; is hereby adopted and made a part of this chapter, the same as if it were fully set forth herein, except as modified or amended by this chapter.

(B) Conflict. In the event there is a conflict between this chapter and the IFC, or a substantive difference in the meanings of wording included in a topic or subject area common to both documents, the wording of this chapter shall supersede the IFC and govern.

13.04.030 – Establishment of Bureau of Fire Prevention

13.04.030 – Establishment of Bureau of Fire Prevention.

The International Fire Code shall be enforced by the Bureau of Fire Prevention of the Clark County Fire Department, which is established, and which shall be operated under the supervision of the Chief of the Clark County Fire Department. The Chief of the Clark County Fire Department shall participate in recommending any proposed modifications to the International Fire Code to the Board of County Commissioners.

13.04.050 – Authority to Issue Administrative or Misdemeanor Citations

13.04.050 – Authority to Issue Administrative or Misdemeanor Citations.

The Chief of the Clark County Fire Department and members of the Bureau of Fire Prevention are authorized to prepare, sign and serve administrative citations, pursuant to Title 1, Chapter 1.14 of the Clark County Code, to enforce provisions of Title 13.

The Chief of the Clark County Fire Department and members of the Bureau of Fire Prevention are authorized to prepare, sign and serve misdemeanor citations, pursuant to NRS 171.17751, to enforce provisions of Title 13.

13.04.060 – Amendments to International Fire Code

13.04.060 – Amendments to International Fire Code.

Certain parts, articles, divisions, chapters, appendices, sections, subsections, referenced standards, and referenced documents of the IFC are added, amended, modified, supplemented, and deleted as provided in the following sections of this chapter. Notwithstanding anything to the contrary contained in the International Fire Code, the terms *fire chief* or *fire code official* as used in that Code shall be the Chief of the Clark County Fire Department or designee.

13.04.070 through 13.04.905

Sections 070 through 905 of Chapter 13.04 contain the various amendments to the adopted code, appendices, and referenced standards. These amendments follow.

2024 IFC

101.1 Title – CC

[A] 101.1 Title. These regulations shall be known as the Fire Code of Clark County, hereinafter referred to as “this code,” or “the fire code.”

101.2.1 Appendices – SN/CC

[A] 101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted. The following appendices are hereby adopted in full as part of this code:

Appendix B – Fire-flow requirements for buildings, as amended.

Appendix C – Fire protection water supplies and fire hydrant locations and distribution, as amended.

Appendix D – Civil improvement plans, as amended.

Appendix H – Hazardous materials management plan (HMMP) and hazardous materials inventory statement (HMIS) instructions.

Appendix P – Proprietary supervising station facilities, as amended.

Appendix Q – Fire protection systems impairments and systems out of service, as amended

All other appendices are expressly not adopted.

101.6 Supplemental rules and regulations – CC

101.6 Supplemental rules and regulations. The *fire code official* is authorized to render interpretations of this code and to make and enforce rules and supplemental policies, regulations and guidelines in order to carry out the application and intent of its provisions. Such interpretations, rules, policies, regulations, and guidelines shall be in conformance with the intent and purpose of this code and shall be available to the public during normal business hours.

102.7.3 Local codes – SN

102.7.3 Local codes. The revised locally adopted codes listed below shall replace the listed referenced documents. References contained herein shall refer to the locally adopted codes.

IMC – 2024, *International Mechanical Code* is replaced with the 2024 *Uniform Mechanical Code*

IPC – 2024, *International Plumbing Code* is replaced with the 2024 *Uniform Plumbing Code*

102.8 Subjects not regulated by this code – CC

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

103.1 Creation of agency – CC

[A] 103.1 Creation of agency. The department of fire prevention is established within the jurisdiction under the direction of the *fire code official*. The function of the department shall be the implementation, administration and enforcement of the provisions of this code.

104.2.3.6.2 Other reports – CC

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any reference testing or analysis, used to determine compliance with code intent and justify code equivalence. The report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the *fire code official*. The *fire code official* is authorized to require design submittals to be prepared by, and bear the stamp or, a Nevada *registered design professional*.

104.12 Fire protection reports – SN

104.12 Fire protection reports. All *high-rise buildings*, *covered mall buildings*, and buildings with an *atrium*, in addition to other complex or major facilities as determined by the *fire code official*, including but not limited to Group H and Group I occupancy buildings, shall have a fire protection report submitted and *approved* prior to construction, demolition, or significant work stoppage. Fire protection reports shall be prepared by a Nevada *registered design professional* working in their area of expertise.

104.12.1 Building fire protection reports. Building fire protection reports shall describe the building uses, construction and life safety features of the entire building.

104.12.2 Tenant improvement and remodel fire protection reports. A fire protection report shall be submitted when any one of the following occurs within a building that would normally require or has a previously *approved* Fire Protection Report (FPR).

1. The area of remodel occurs over a floor area exceeding 20,000 square feet.
2. The area of remodel is an assembly occupancy with an *occupant load* that exceeds 1,000 persons.
3. The area of remodel occurs within spaces dedicated to or affecting emergency personnel response areas, such as exit enclosures, elevators, elevator lobbies, *fire command centers*, secondary response points, fire riser rooms, and fire pump rooms.
4. The tenant improvement space is not intended to install a sprinkler isolation control valve.
5. The remodel area requires specific engineered fire suppression and/or alarm systems that will require an alternate means of system design that is not supported by adopted NFPA codes.
6. The remodel area includes clean agent suppression systems, new or existing.
7. The remodel includes kitchen exhaust systems that are used for smoke control or smoke removal and thereby requiring coordination of exhaust fan functioning.
8. The remodel area contains *hazardous materials* storage and/or use areas in any amount.
9. The remodel area includes *high-piled combustible storage*.
10. The remodel area includes access-controlled egress doors, delayed egress door hardware or other hardware systems that are interconnected with *fire protection systems*.
11. The remodel area modifies an existing smoke control system, smoke removal system, smoke control boundary or smoke removal boundary and the *fire code official* requires submittal of a remodel FPR.

12. Fire protection tenant improvement and/or remodel reports are also required for all assembly, residential, high rise, covered mall, atrium and other complex or major facilities that have a previously *approved* FPR when required by the *fire code official*.

104.12.3 Alternate materials and methods report. An alternate materials and methods request shall be submitted when any of the following items are involved.

1. All instances where active fire protection features are offered as a mitigation in support of an alternative solution.
2. All requests relating to or referencing the *International Fire Code* or NFPA codes adopted within the *International Fire Code*.
3. All requests that involve alternate installation requirements of any *active fire protection system* governed by either the *International Fire Code* or Chapter 9 of the *International Building Code*, such as: *automatic sprinkler systems*, alternative *automatic fire extinguishing systems*, standpipe systems, fire alarm and detection systems, *emergency alarm systems*, fire department connections and smoke control graphic annunciator panels. Additionally, requests involving the modification of the following items shall be submitted to the *fire code official*: smoke and heat vents, *fire command centers*, thin combustible ceilings, *hazardous materials*, and alternate hardware when it may affect entry into a building by emergency responders.

104.12.4 Temporary certificate of occupancy (TCO) fire protection report. When a temporary certificate of occupancy (TCO) is requested in a building that required a fire protection report prior to construction, the *fire code official* is authorized to require a fire protection report describing the uses to be occupied, the completed construction features, and the status of life safety systems, be submitted and *approved* prior to approval of the TCO request.

104.12.5 Hazardous materials, fog effects, and asphyxiants. Complex permits for *hazardous materials*, fog effects, and asphyxiants shall have fire protection reports submitted to address the hazards of the installation, as required by the *fire code official*.

104.13 Citations – CC

104.13 Citations. The *fire code official* is authorized to issue a citation to persons operating or maintaining an occupancy, premises or vehicle subject to this code who allow a hazard to exist or fail to take immediate action to abate a hazard on such occupancy, premises or vehicle when ordered or notified to do so.

105.1.3 Multiple permits for the same location – CC

105.1.3 Multiple permits for the same location. Where more than one permit is required for the same location, the *fire code official* is authorized to consolidate such permits into a single permit provided that each provision is listed in the permit. Where multiple individual permits are combined, the associated permit fees per Section 108 shall be added to calculate the required permit fee.

105.1.7 Certificate of Insurance – SN/CC

105.1.7 Certificate of Insurance. A valid Certificate of Insurance shall be submitted to, or be on file with, the *fire code official* when applying for a permit to conduct specific operations.

> **Exception:** The requirement for an insurance certificate may be waived by the *fire code official's* Risk Manager.

105.1.7.1 Certificate Information Required. The certificate shall be issued by an insurance company authorized to conduct business in the State of Nevada or be named on the list of authorized insurers maintained by the Nevada Department of Business and Industry, Division of Insurance.

The following information shall be provided on the certificate:

1. The contractor shall be named as the insured. If the insurance is provided by an individual, company or partnership other than the contractor, the contractor shall be named as an additional insured.
2. “Insert name of jurisdiction it’s agents, employees and volunteers” shall be named as both an additional insured and certificate holder.
3. General liability limits, including contractual liability, in the minimum amounts specified below of the specific operation being conducted:
    - 3.1. To erect temporary membrane structures, tents, or canopies. See Chapter 31: $2,000,000.
    - 3.2. To store or use explosive materials or pyrotechnic displays. See Chapter 56: $5,000,000.

        Exception: The *fire code official* is authorized to reduce the liability limits to $1,000,000 for small private party blasting operations such as personal mining claims or agricultural uses and for stands for Safe and Sane fireworks. Under no circumstance will this include development related blasting activities, quarry blasting, construction blasting, or other similar large scale blasting operations.
    - 3.3. To operate a special amusement building. See Chapter 9: $2,000,000.
    - 3.4. To operate flame effects, or to perform as a fire performer. See Section 308.3.2 and NFPA 160: $2,000,000.
    - 3.5. To operate an outdoor assembly event with an occupant load in excess of 1,000 persons. See Chapter 31: $1,000,000.

105.1.7.2 Additional Insurance. Greater liability insurance amounts may be required in certain cases (such as building implosions) as deemed necessary by the *fire code official*.

105.2 Application – CC

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

Applications shall be filled out by the *owner*, contractor, or representative thereof. The application type, service delivery requested, property description, and applicant information shall be provided in an *approved* manner.

Where an application for permit requires submittal documentation, submittal documentation shall be provided in such form and detail as required by the *fire code official* and shall show compliance with this code. All submittal documentation shall be clear, legible and readable.

105.3.1 Expiration – CC

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

105.3.1.1 Renewal of expired permits – CC

105.3.1.1 Renewal of expired permits. Upon the expiration of a permit, before work can be recommenced, a permit renewal shall be obtained. The permit renewal fee shall be one-half the amount required for an initial permit for such work, provided no changes have been made or will be made in the original *approved construction documents*. After one year (365 days) following the last *approved* inspection or since the issue date of the permit(s), the permit applicant must file an application for a new permit(s). Renewal of a permit issued prior to the current code cycle will only be allowed when authorized by the *fire code official*.

105.5 Required operational permits – CC

105.5 Required operational permits. The *fire code official* is authorized to issue operational permits for the operations set forth in Sections 105.5.1 through 105.5.70.

105.5.5 Carnivals and fairs – SN

105.5.5 Carnivals and fairs. This section is deleted from the IFC.JUSTIFICATION: Locally, carnivals and fairs are permitted as outdoor assembly events under Section 105.5.40. Section 3103.3, Outdoor Assembly Event, includes carnivals and was amended to include fairs.

105.5.7 Combustible dust-producing operations – CC

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

> **Exception:** Woodworking operations that occupy less than 5,000 square feet (464 m^2) and where the dust-producing equipment requires an aggregate dust collection flow rate of less than 1,500 cfm (0.71 m^3/s) are exempt from a permit.

105.5.9 Compressed gases – SN

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

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

TABLE 105.5.9 – PERMIT AMOUNTS FOR COMPRESSED GASES	
TYPE OF GAS	**AMOUNT (cubic feet at NTP)**
Carbon dioxide used in carbon dioxide enrichment systems	875 (100 lb)
Carbon dioxide used in insulated liquid carbon dioxide beverage dispensing applications or theatrical fog effects	875 (100 lb)
Corrosive	200
Flammable (except cryogenic fluids and liquified petroleum gases)	200
Highly Toxic	Any Amount
Inert and simple asphyxiant	6,000
Oxidizing (including oxygen)	504
Pyrophoric	Any Amount
Toxic	Any Amount
Liquified carbon dioxide	875 (100 lb)
For SI: 1 cubic foot = 0.02832 m^3.	

105.5.15 Exhibits and trade shows – CC

105.5.15 Exhibits and trade shows. An operational permit is required to operate exhibits and trade shows with an *occupant load* of 300 persons or greater.

A single exhibit and trade show permit is allowed for separate rooms that are used for the same event/use, provided the rooms are located on the same floor level and are within 250 feet (76 200 mm) of each other, as measured along egress routes.

Where an exhibit or trade show includes multiple layouts used over the course of the event, a separate permit is required for each layout.

105.5.30 LP-gas – SN/CC

105.5.30 LP-gas. An operational permit is required for:

1. Storage and use of LP-gas.

   Exceptions:

   1. A permit is not required in Group R-3 occupancies and buildings constructed in accordance with the *International Residential Code*.
   2. An operational permit is not required for individual containers with a 30-gallon (113.6 L) water capacity or less or multiple containers having an aggregate quantity not exceeding 30 gallons (113.6 L) water capacity.
   3. Operation of cargo tankers that transport LP-gas.
   4. An operational permit is not required for LP-gas used in accordance with Section 4106, Mobile Food Preparation Vehicles.

105.5.34 Mobile food preparation vehicles – CC

105.5.34 Mobile food preparation vehicles. An operational permit is required for mobile food preparation vehicles equipped with appliances that produce smoke or grease-laden vapors. This operational permit shall incorporate all permittable operations that are in support of the mobile food preparation vehicle.

105.5.38 Open flames and candles – CC

105.5.38 Open flames and candles. An operational permit is required to use open flames or candles in connection with assembly areas, dining areas of restaurants or drinking establishments. Annual permits for open flames and candles that are periodically used at facilities are acceptable where the permit application provides all the conditions surrounding the use of the particular open flames or candles. This annual permit allows a facility to use preapproved open flames and candles repeatedly throughout the year.

Exception: Alcohol-based food-warming devices do not require a permit.

105.5.51 Temporary membrane structures, special event structures and tents – CC

105.5.51 Temporary membrane structures, special event structures and tents. An operational permit is required to operate an air-supported temporary membrane structure or a tent having an area in excess of 400 square feet (37 m^2). *Temporary special event structures* in excess of 2,500 square feet (232 m^2) shall require an operational permit.

Exceptions:

1. Tents used exclusively for recreational camping purposes.
2. Tents, curtains and extensions attached thereto, when used for funeral services.
3. Tents open on all sides, which comply with all the following:
    - 3.1. Individual tents having a maximum size of 700 square feet (65 m^2).
    - 3.2. The aggregate area of multiple tents placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m^2) total.
    - 3.3. A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be provided.
4. *Temporary special event structures* erected inside of a *building* or structure that has a current Certificate of Occupancy.

105.5.58 Fire pumps – SN

105.5.58 Fire pumps. An operational permit is required for temporary and permanent fire pumps.

105.5.59 Hood suppression systems – SN

105.5.59 Hood suppression systems. An operational permit is required for *automatic fire-extinguishing systems* protecting commercial cooking systems.

105.5.60 Emergency responder communications enhancement systems – SN

105.5.60 Emergency responder communications enhancement systems. An operational permit is required to operate an Emergency Responder Communications Enhancement System regulated by Chapter 5.

105.5.61 Monitoring facilities – SN

105.5.61 Monitoring facilities. An operational permit is required for any facility that remotely monitors electronic signals initiated by *fire protection systems* such as central or supervising facilities.

105.5.62 Proprietary / self-monitoring – SN

105.5.62 Proprietary / self-monitoring. An operational permit is required to operate an onsite proprietary (self) monitoring fire alarm system. See Appendix P.

105.5.63 Smoke control and/or removal systems – SN

105.5.63 Smoke control and/or removal systems. An operational permit is required for facilities that have smoke control and/or removal systems.

105.5.64 Special activity – SN

105.5.64 Special activity. An operational permit is required at locations that operate Christmas trees, pumpkin patch lots, and similar locations. See Section 324.

105.5.65 Tire storage – SN

105.5.65 Tire storage. An operational permit is required to store tires in excess of 1,000 cubic feet (28.3m^3). See Chapter 34.

105.5.66 Wood and plastic pallets – SN

105.5.66 Wood and plastic pallets. An operational permit is required for new and existing facilities which store more than 50 idle pallets on site, either inside or outside of a building.

105.5.67 Radioactive materials – CC

105.5.67 Radioactive materials. An operational permit is required to store or handle at any installation any amount of radioactive material for which a specific license from the Nuclear Regulatory Commission and/or Nevada Division of Public and Behavioral Health Radiation Control Program is required.

105.5.68 Flame effects – CC

105.5.68 Flame effects. An operational permit is required to produce combustion through the use of flammable solids, liquids, or gases to produce thermal, physical, visual, or audible phenomenon for entertainment, exhibition, demonstration or simulation. See NFPA 160.

105.5.69 Sale and retail display of consumer fireworks – CC

105.5.69 Sale and retail display of consumer fireworks. An operational permit is required for the sale and retail display of consumer fireworks in accordance with the *Clark County Fire Department Guideline for Fireworks*.

105.6 Required construction permits – CC

105.6 Required construction permits. The *fire code official* is authorized to issue construction permits for work as set forth in Sections 105.6.1 through 105.6.36.

Where both an operational permit per Section 105.5 and a construction permit per Section 105.6 of the same title are required, a single submittal covering both the operational and construction permit requirements shall be acceptable.

105.6.3 Compressed gases – SN

[A] 105.6.3 Compressed gases. Where the *compressed gases* in use or storage including fog effect and beverage dispensing systems that utilize CO_2 exceed the amounts listed in Table 105.5.9, a construction permit is required to install, repair damage to, abandon, remove, place temporarily out of service, or close or substantially modify a *compressed gas* system.

Exceptions:

1. Routine maintenance.
2. For emergency repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.
3. Category 3 compressed air and/or piped vacuum systems as defined by NFPA 99.

105.6.7 Fire alarm and detection systems, related equipment, and dedicated function fire alarm systems (i.e. monitoring) – SN

[A] 105.6.7 Fire alarm and detection systems, related equipment, and dedicated function fire alarm systems (i.e. monitoring). A construction permit is required for the following:

1. Installation of or modification (including but not limited to: extending; reprogramming; upgrading field programmable EPROM, or altering) to fire alarm and detection systems, related equipment, and dedicated function fire alarm systems.
2. Replacement of recalled fire protection components.
3. Control equipment replacement.

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

105.6.19 Fire hydrants and associated piping – CC

105.6.19 Fire hydrants and associated piping. A construction permit is required for the installation or modification of fire hydrants and associated piping including fire service mains, sprinkler system laterals and temporary fire hydrants. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

Exception: Public utility fire hydrants do not require fire prevention installation permits where the installation is inspected by the water purveyor.

105.6.26 Fire protection reports – SN

105.6.26 Fire protection reports. A permit is required for the review and approval of a Fire Protection (Life Safety) Report. See Chapter 1.

105.6.27 Proprietary (self) monitoring facilities – SN

105.6.27 Proprietary (self) monitoring facilities. The *fire code official* is authorized to require a construction permit for the installation of or modification to an onsite proprietary (self) monitoring facility. See Appendix P.

105.6.28 Refrigeration systems – SN

105.6.28 Refrigeration systems. A construction permit is required for the installation of a mechanical refrigeration system covered by Section 608.

105.6.29 Two-way communication systems – SN

105.6.29 Two-way communication systems. A construction permit is required for the installation of or modification to a two-way communication system. See Section 1009.8.

105.6.30 Water tanks – SN

105.6.30 Water tanks. A construction permit is required for the installation of or modification to a water tank used to supply a fire protection system. See Chapters 5, 9, and NFPA 22.

> **Exception:** Permits are not required for installation of tanks controlled by a water purveyor governed by the Nevada Public Service Commission, a State of Nevada Charter, or other public franchise.

105.6.31 Smoke control, smoke removal or smoke exhaust systems control panels – CC

105.6.31 Smoke control, smoke removal or smoke exhaust systems control panels. A construction permit is required for installation of or modification to a smoke control, smoke removal or smoke exhaust system control panel. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

105.6.32 Fire apparatus access road – CC

105.6.32 Fire apparatus access road. A construction permit is required for the installation of or modification to a fire apparatus access road required for a protected premises. See Chapter 5 and Appendix D.

105.6.33 Heliports, helistops, and emergency landing pads – CC

105.6.33 Heliports, helistops, and emergency landing pads. A construction permit is required for the installation of or modification to a *heliport*, *helistop*, and/or emergency landing pad. See Chapter 20 and NFPA 418.

105.6.34 Radioactive materials – CC

105.6.34 Radioactive materials. A construction permit is required to store or handle at any installation any amount of radioactive material for which a specific license from the Nuclear Regulatory Commission and/or Nevada Division of Public and Behavioral Health Radiation Control Program is required.

105.6.35 In-building riser – CC

105.6.35 In-building riser. A construction permit is required for the installation of or modification to in-building risers. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

108.1 Fees – CC

[A] 108.1 Fees. A permit shall not be issued until the fees have been paid, nor shall a *revision* to a permit be released until the additional fee has been paid.

108.1.1 Fee definitions – CC

108.1.1 Fee definitions. For the purposes of Section 108, the following terms are defined:

Initial Submittal. The first submittal occurring under either an application for permit or an application for *revision*.

Resubmittal. Subsequent submittals occurring after the *initial submittal* under either an application for permit or an application for *revision*.

Revision. An application proposing to revise or amend an active permit. A *revision* will contain an *initial submittal* and may contain *resubmittal(s)*.

108.2 Permit and service fee schedule – CC

[A] 108.2 Permit and service fee schedule. Fees for permits, inspections and other services shall be in accordance with this section, known as the Permit and Service Fee Schedule, as adopted and amended from time to time by the Commission of Clark County.

Where an Administrative Fee is referenced, it shall be in accordance with Section 108.2.4. Where a Plan Review Fee or Revision Review Fee is referenced, it shall be in accordance with Section 108.2.5. Where a Permit Fee is referenced, it shall be in accordance with Section 108.2.6.

All fees listed in Section 108 including Tables 108.2.6(1) through 108.2.9 may be subject to an amount not to exceed a 3% increase at the beginning of each fiscal year.

108.2.1 Total permit fee – CC

108.2.1 Total permit fee. Fees required before permit issuance shall be in accordance with this section. The Total Permit Fee shall be calculated to be:

Total Permit Fee = Administrative Fee + Plan Review Fee + Permit Fee

108.2.2 Revision fee – CC

108.2.2 Revision fee. Fees required before approval of *revisions* shall be in accordance with this section. The Revision Fee shall be calculated to be:

Revision Fee = Administrative Fee + Revision Review Fee

108.2.3 Renewal fee – CC

108.2.3 Renewal fee. For those permit types required to be renewable, the Renewal Fee shall be paid annually, prior to the renewal due date. The Renewal Fee shall be calculated to be:

Renewal Fee = Administrative Fee + Permit Fee

Where *approved* by the *fire code official*, the Administrative Fee may be waived where a *revision* was approved within 30 days of the renewal due date.

108.2.3.1 Late fee – CC

108.2.3.1 Late fee. A late fee of $130.00 shall be applied to each 30-day period past the renewal due date.

108.2.4 Administrative fee – CC

108.2.4 Administrative fee. The Administrative Fee shall be $65.00.

108.2.5 Plan review fee – CC

108.2.5 Plan review fee. The Plan Review Fee shall be calculated as follows:

(1) The initial plan review fee of $195.00 shall be applied and shall include the plan review of the *initial submittal* and the first *resubmittal*.

(2) For each review beyond the first *resubmittal*, an additional plan review fee shall be applied, calculated at the hourly rate for "Additional plan review fees" as described in Table 108.2.7.

The *fire code official* shall have the authority to designate certain permit types or limited scopes of certain permit types to be Permit By Inspection (PBI). For those scopes of work designated to be PBI and applied for as such, the Plan Review Fee shall not be applied.

108.2.5.1 Revision review fee – CC

108.2.5.1 Revision review fee. The Revision Review Fee shall be calculated at the hourly rate for "Additional plan review fees" as described in Table 108.2.7 and shall be applied for the review of the *initial submittal* and for the review of each *resubmittal*.

108.2.5.2 Express plan review – CC

108.2.5.2 Express plan review. The *fire code official* may establish an express plan review program with rules and regulations, subject to workload and staff availability for providing express services without adversely impacting normal plan review activities. Where an express plan review is performed, the Express Plan Review Fee shall be added to either the Plan Review Fee of Section 108.2.1 or the Revision Review Fee of Section 108.2.2. The Express Plan Review Fee shall be as follows:

1. Where an express plan review is performed during an application for permit, the Express Plan Review Fee shall be calculated to be:

Express Plan Review Fee = 2 × Permit Fee

2. Where an express plan review is performed during an application for *revision*, the Express Plan Review Fee shall be calculated to be:

Express Plan Review Fee = 2 × Revision Review Fee

108.2.6 Permit fee – CC

108.2.6 Permit fee. The Permit Fee shall be in accordance with Tables 108.2.6(1) through 108.2.6(5). The minimum permit fee shall be $130.00.

108.2.7 Additional services related to plan review and inspections – CC

108.2.7 Additional services related to plan review and inspections. Fees for services related to plan review and inspections not otherwise covered by Sections 108.2.1 through 108.2.6 shall be in accordance with Table 108.2.7.

108.2.8 Other service fees – CC

108.2.8 Other service fees. Fees for other services shall be in accordance with Table 108.2.8.

108.2.9 Fire personnel and equipment – CC

108.2.9 Fire personnel and equipment. Fees for fire personnel and equipment shall be in accordance with Table 108.2.9.

108.2.10 Affordable housing fee reduction – CC

108.2.10 Affordable housing fee reduction. Pursuant to the Resolution No. 3-16-21-4 approved by the Board of County Commissioners on March 16, 2021, certain affordable housing development projects are entitled to the reduction in development fees assessed in section 108.2 of this code as follows:

1. Affordable housing projects that meet a criteria of a deed restricted sales or rent targeting between 61-80% of AMI may receive a reduction in fees of 50%.
2. Affordable housing projects that meet a criteria of a deed restricted sales or rent targeting 60% of AMI or below may receive a reduction in fees of 75%.
3. Affordable housing projects that offer a blend of rental rates or sales prices, may qualify for a calculated fee reduction on the blended rates.

Only projects issued an Affordable Housing Certificate by Clark County Community Resource Management will be eligible for the discounted fees as stated under this section.

108.3 Permit quantities – CC

108.3 Permit quantities. The applicant for a permit shall provide an estimated quantity for which the Permit Fee is based off of at the time of application. Where, in the opinion of the *fire code official*, the quantity is underestimated, the permit shall be denied unless the applicant can show detailed estimates acceptable to *the fire code official*. The *fire code official* shall have the authority to adjust the final quantities for Permit Fees.

108.4 Work commencing before permit issuance – CC

[A] 108.4 Work commencing before permit issuance. An entity who commences any work, activity or operation regulated by this code before obtaining the necessary permits or where work has been found to exceed the scope of a valid permit shall be subject to the Unpermitted Work Fee in accordance with this section, which shall be in addition to the required fees in accordance with Section 108.2. The Unpermitted Work Fee shall be calculated to be:

Unpermitted Work Fee = Express Plan Review Fee + Unpermitted Inspection Fee

The Express Plan Review Fee shall be in accordance with Section 108.2.5.2(1).
The Unpermitted Inspection Fee shall be calculated at the hourly rate for "Unpermitted inspection fee" as described in Table 108.2.7

108.6 Refunds – CC

[A] 108.6 Refunds. The *fire code official* may authorize the refunding of any fee imposed by this Chapter, which was erroneously paid or collected. The *fire code official* shall not authorize the refunding of any fee paid except upon written application filed by the original permit holder not later than 180 days after the date of fee payment. Limits placed on refunds include:

1. Not more than 80 percent of any up-front fee paid at the time of *initial submittal* when no work in reviewing the application has been done under a permit application prior to the issuance of the permit in accordance with this Chapter; or,
2. Not more than 80 percent of the permit fee paid at the time of permit issuance when no work has been done under a permit issued in accordance with this Chapter; or,
3. The *fire code official* may authorize credit towards the purchase of replacement permits for work destroyed during construction by a natural or manmade catastrophe of up to one-half of the original total permit fee paid. The amount of the credit shall be pro-rated based on the number of required inspections completed before destruction.
4. The *fire code official* may authorize a 100% refund in the event that an error has been made by the Department, as determined by the *fire code official*. The refund amount is limited to the fees collected in error. In the event the Department requires an incorrect permit type to be void, the *fire code official* may authorize a credit from fees paid to be applied to the correct replacement permit.

TABLE 108.2.6(1)—PERMIT FEE BASED ON COMPONENT COUNTS	
The Permit Fee for permit types listed in this table which are based on component counts shall be calculated to be: **Permit Fee** = $130.00 × Quantity of Components	
PERMIT TYPE	**COMPONENT DESCRIPTION**
Access gates	Each gate (automatic or manual)
Amusement buildings	Each amusement building
Covered mall buildings - Kiosks	Each kiosk
Explosives - storage	Each bunker or magazine
Hot-work operations	Each location (mobile, fixed, or combination)
Industrial ovens	Each oven
Open flames and candles	Each device/assembly type. (i.e. if there are five candelabras, 25 candles, and four portable stoves, the component quantity is three representing three device types)
Pyrotechnic special effects materials - July 4 sales booth	Each booth
Special activity lot	Each activity (i.e. Christmas tree lot, pumpkin patch, hay-ride lot, etc.)
Spraying or dipping	Each spray booth, spray area, or dipping area

TABLE 108.2.6(2)—PERMIT FEE BASED ON QUANTITY OF MATERIALS

The Permit Fee for permit types based on quantity of materials shall in accordance with this table. The Permit Fee for the following permit types shall be based on quantity of materials:

- Aerosol products
- Compressed gas medical gas
- Cryogenic fluids
- Dry cleaning plants
- Flammable/combustible liquids
- Hazardous materials
- HPM facilities
- LP gases (Commercial aggregate, over 4,000 gallons water capacity)
- Organic coatings
- Refrigeration equipment

The Permit Fee shall be calculated to be:

Permit Fee = $130.00 × Range

QUANTITY OF MATERIALS ("X")			RANGE
SOLIDS (POUNDS)	**LIQUIDS (GALLONS)**	**GASES (CUBIC FEET)**	
0 < X ≤ 499	0 < X ≤ 54	0 < X ≤ 199	1
499 < X ≤ 1,000	54 < X ≤ 500	199 < X ≤ 1,999	2
1,000 < X ≤ 2,000	500 < X ≤ 946	1,999 < X ≤ 3,600	3
2,000 < X ≤ 3,000	946 < X ≤ 1,836	3,600 < X ≤ 6,800	4
3,000 < X ≤ 4,000	1,836 < X ≤ 4,500	6,800 < X ≤ 16,400	5
4,000 < X ≤ 5,000	4,500 < X ≤ 15,180	16,400 < X ≤ 35,000	6
5,000 < X ≤ 10,000	15,180 < X ≤ 65,681	35,000 < X ≤ 54,000	7
10,000 < X ≤ 11,000	65,681 < X ≤ 70,000	54,000 < X ≤ 74,000	8
11,000 < X ≤ 12,000	70,000 < X ≤ 75,000	74,000 < X ≤ 80,000	9
12,000 < X ≤ 13,000	75,000 < X ≤ 80,000	80,000 < X ≤ 85,000	10
13,000 < X ≤ 14,000	80,000 < X ≤ 85,000	85,000 < X ≤ 90,000	11
14,000 < X	85,000 < X	90,000 < X	12

For SI: 1 pound = 0.4536kg, 1 gallon = 3.785L, 1 cubic foot = 0.02832m^3.

TABLE 108.2.6(3)—PERMIT FEE BASED ON SQUARE FOOTAGE

The Permit Fee for permit types based on square footage shall in accordance with this table. The Permit Fees for the following permit types shall be based on square footage:

- Aviation facilities
- Aircraft repair hangars
- Combustible dust-producing operations
- Exhibits and trade shows
- High-piled combustible storage
- Places of assembly
- Temporary outdoor membrane structures, tents, and temporary special event structures

The Permit Fee shall be calculated to be:

Permit Fee = $130.00 × Range

SQUARE FOOTAGE ("X")	RANGE
0 < X ≤ 14,999	1
14,999 < X ≤ 74,999	2
74,999 < X ≤ 149,999	3
149,999 < X	4

TABLE 108.2.6(4)—PERMIT FEE
BASED ON FIREWORK & PYROTECHNIC QUANTITIES

The Permit Fee for permit types based on firework and pyrotechnic quantities shall in accordance with this table. The Permit Fes for the following permit types shall be based on firework and pyrotechnic quantities:

- Explosives – fireworks/pyrotechnics
- Pyrotechnic special effects materials – fireworks/pyrotechnics

The Permit Fee shall be calculated to be:

Permit Fee = $130.00 × Range

QUANTITY OF FIRWORKS/PYROTECHNIC DEVICES (“X”)	RANGE
0 < X ≤ 500	1
500 < X ≤ 1,500	2
1,500 < X ≤ 2,500	3
2,500 < X	4

TABLE 108.2.6(5)—PERMIT FEE BASED ON FIRE PROTECTION SYSTEMS The Permit Fee for fire protection systems shall be in accordance with this table. The Permit Fee shall be the greater of the calculated permit fee or the minimum permit fee.		
PERMIT TYPE	**PERMIT FEE**	
	CALCULATION	**MINIMUM FEE**
Fire protection system repair, replacement, or upgrade	50% of the fire protection system specific Permit Fee.	$130.00
Automatic fire sprinkler	$20.00 per 1,000 sq.ft.	
Civil underground	$45.00 per Acre	
Dry chemical suppression	$16.00 per 100 sq.ft.	
Emergency Responder Communications Enhancement System	$1.00 per 1,000 sq.ft.	
Fire alarm	$1.00 per 100 sq.ft.	
Fire pumps	$3.00 per 1,000 sq.ft.	
In-building riser	$130.00 per riser.	
Smoke control and removal systems	$130.00.	
Standpipe	$2.00 per 1000 sq.ft.	
Wet chemical suppression	$13.00 per 100 sq.ft.	
Water supply storage tank	$15.00 per 1,000 gallons	
For SI: 1 sq.ft. = 0.0929 m^2, 1 gallon = 3.785L.		

TABLE 108.2.7—FEES FOR ADDITIONAL SERVICES RELATED TO PLAN REVIEW AND INSPECTIONS		
SERVICE	**FEE**	**COMMENTS**
Administrative Fee	$65.00 per hour	Shall apply to all applications or services.
Reinspection fee	$130.00 per hour, per person	Minimum one hour, to include travel time. Applies to second and subsequent reinspection for same deficiencies.
Same-day inspection fee	$390.00	Where a same day inspection occurs after-hours, this fee shall be added to the overtime inspection fee.
Overtime inspection fee	$130.00 per hour, per person	Minimum three hours per person, to include travel time.
Inspections or service for which no fee is specifically indicated	$130.00 per hour, per person	Actual time worked. Minimum one hour, to include travel time. Fee is assessed for inspections and services for any building, structure or premises which is not covered by an existing valid permit or for other situations where requested by the customer, for work to be conducted at the option of the *fire code official*.
Unpermitted inspection fee	$390.00 per hour, per person	Minimum three hours per person, to include travel time.
Additional plan review fees	$130.00 per hour	Minimum one hour. Rounded to next half-hour. Applies to: -Review of application for permit second and subsequent *resubmittals*. -Review of each *revision* submittal (*initial submittal* and *resubmittal(s)*).
Overtime plan review fees	$130.00 per hour	Minimum three hours. Plan review requested outside of regular business hours. Overtime plan review requires the Express Plan Review Fee be applied.
Customer requested review	$130.00 per hour + Administrative Fee	Minimum one hour. Reviews requested by customers not otherwise required by this code such as mylar/bond submittals.
Fire protection report (full facilities, alternate methods, TCO)	$130.00 per hour + Administrative Fee	Minimum two hours.
Fire protection report (tenant improvement, remodels)	$130.00 per hour + Administrative Fee	Minimum one hour.

TABLE 108.2.7—FEES FOR ADDITIONAL SERVICES RELATED TO PLAN REVIEW AND INSPECTIONS		
SERVICE	**FEE**	**COMMENTS**
Technical opinion and report	$130.00 per hour + Administrative Fee	Minimum one hour. Reports such as emergency planning and preparedness.
Letter of agreement and other reviews	$130.00 per hour + Administrative Fee	Minimum one hour. Reports such as combustible load-in policies, project phasing agreements, modifications, etc.
Sprinkler design flow test	$130.00 + Administrative Fee	

TABLE 108.2.8—FEES FOR OTHER SERVICES		
SERVICE	**FEE**	**COMMENTS**
Additional services provided by Fire Prevention not specified herein	$130.00 per hour	
Address change without plans change	$65.00 for permit reprint only, no plan changes.	
Address change with plans change	See Section 108.2.2.	Where plans are required to be updated with the changed address, an application for *revision* is required.
Dedicated Staff Fee	$215.00 per hour, per person	For major projects that request that the *fire code official* assign one or more inspectors to be available on-site to perform inspections on call or assign one or more plans reviewers to perform plans review on an expedited fashion. This service is subject to available resources and requires a preapproved and executed agreement prior to commencement.
Extension of unexpired construction permit	$65.00 for each extension of time for an unexpired construction permit	Maximum of 1 extension of an additional 180 days permitted if request is made prior to expiration of the permit
Nuisance alarm fee	$500.00	Payable to the Clark County Fire Department.
Nuisance or unnecessary emergency responses	Actual fire personnel and equipment using rates as defined in Table 108.2.9.	At the *fire chief's* discretion, the fire department may charge the property owner or permit holder for any resources utilized to respond to an emergency in which a preventable hazardous condition caused the emergency response. This includes, but is not limited to, building, health, and fire code violations, insufficient on-site resources, or an insufficient safety plan.
Returned check fee	$25.00	

TABLE 108.2.9—FEES FOR FIRE PERSONNEL AND EQUIPMENT		
SERVICE	**FEE**	**COMMENTS**
Battalion Chief	$163.00 per hour	Minimum of 4 hours per fire personnel and/or fire equipment to staff an event; all fees shall be applied and payable to the Clark County Fire Department. All apparatus standby, fire personnel and equipment rates may be subject to an amount not to exceed a 3% increase at the beginning of each fiscal year.
Emergency Medical Services (EMS) Coordinator	$136.00 per hour	
Fire Captain	$125.00 per hour	
Fire Engineer	$109.00 per hour	
Fire Investigator	$109.00 per hour	
Logistic Officer	$109.00 per hour	
Fire Fighter	$97.00 per hour	
Engine Unit or Utility Vehicle (with 4 fire personnel)	$545.00 per hour	
Utility Vehicle (with 3 fire personnel)	$435.00 per hour	
Rescue Unit or Utility Vehicle (with 2 fire personnel)	$325.00 per hour	

110.3 Recordkeeping – SN

[A] 110.3 Recordkeeping. A record of periodic inspections, tests, servicing and other operations and maintenance shall be maintained on the premises or other *approved* location for not less than 3 years, or a different period of time where specified in this code or referenced standards. Records shall be made available for inspection by the *fire code official*, and a copy of the records shall be provided to the *fire code official* on request.

The *fire code official* is authorized to prescribe the form, format, and timing of such record keeping. This shall include all records listed below or as otherwise indicated by the *fire code official*.

1. Annual Fire Alarm
2. Semi-Annual Hood Suppression
3. Kitchen Hood Cleaning (as directed)
4. Annual Standpipe
5. Annual Emergency Radio (ERCES)
6. Annual Private Hydrants
7. Quarterly Fire Sprinkler
8. Annual Fire Pump
9. Semi-Annual Clean Agent
10. Semi-Annual Paint & Spray Booths
11. Energy Storage Systems (ESS)
12. 5-year Internal Pipe
13. 5-year Standpipe

110.3.1 Required Reports. The *fire code official* is authorized to require that certain required records be filed with the *fire code official*. Official reports shall be submitted to the *fire code official* and maintained through an *approved* electronic or web-based system. Required reports shall include all scenarios where a system impairment or deficiency has been identified, or where required system service has been declined, or where there is or will be a discontinuance of a required service. Required reports shall be uploaded to the *approved* electronic platform within the following timeframes:

Impairments - the licensed service contractor shall notify the property *owner* and the authority having jurisdiction of the impairment not later than the next business day after verifying the condition.

Deficiencies - If documented deficiencies have not been corrected within 30 calendar days of notifying the building *owner* or designated responsible party, the licensed service contractor shall report the deficiencies to the authority having jurisdiction within 2 business days after the 30 calendar day's notification to the building owner expires.

Cancellation/Discontinuance of Service - A licensed firm must give 30 calendar days' written notice to the *owner* and the occupant, and electronic notification through the *approved* platform to the authority having jurisdiction before it may discontinue service to the *owner* or the occupant, or both.

112 Board of fire code appeals – CC

SECTION 112–BOARD OF FIRE CODE APPEALS

[A] 112.1 Board of Fire Code Appeals, established. In order to hear and decide appeals of orders, decisions or determinations made by the *fire code official* relative to the application and interpretation of this code, there shall be and is hereby created a Board of Fire Code Appeals hereinafter referred to as the Board. The Board shall be appointed by the applicable governing authority and shall hold office at its pleasure. The *fire code official* shall be the secretary of the Board but shall have no vote on any matter before the Board. The Board shall adopt rules of procedure for conducting its business, and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *fire code official*.

[A] 112.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply, or an equivalent or better form of construction is proposed. The Board shall have no authority to waive requirements of this code.

[A] 112.3 Qualifications. The Board shall consist of members who are qualified by experience and training on matters pertaining to the provisions of this code and are not employees of the Fire Prevention Bureau.

[A] 112.4 Administration. The *fire code official* shall take action without delay in accordance with the decision of the Board.

112.5 Members.

The members shall be qualified by training and experience to decide matters pertaining to building construction and building service equipment. The members shall not be employees of the Fire Prevention Bureau. The members of the Board shall consist of the following:

1. One (1) Fire Protection Engineer registered by the State of Nevada;
2. One (1) Civil Engineer registered by the State of Nevada;
3. One (1) fire sprinkler contractor licensed by the State of Nevada;
4. One (1) fire alarm contractor licensed by the State of Nevada;
5. One (1) representative of the exhibit and trade industry;
6. One (1) specialist, as identified in Section 104.2.2, in fire safety;
7. One (1) specialist, as identified in Section 104.2.2, in hazardous materials;

8. One (1) layperson; and
9. The *fire chief* of Clark County Fire Department.

The members of the Board shall be appointed for terms of four years by the Board of County Commissioners and may be removed from office at any time by the Board of County Commissioners.

112.6 Procedures. The Board shall adopt rules and procedures for conducting its investigations and hearings. A person (the appellant) who wishes to appeal a determination of the *fire code official* to the Board shall submit a written request for appeal to the *fire code official* within 15 business days of the original determination by the *fire code official*. The *fire code official* shall provide to the appellant a copy of the guidelines for preparing appeals and a copy of the Board's rules and procedures. The appellant will be responsible to prepare a written appeal in compliance with the guidelines. The *fire code official* will schedule a hearing before the Board. The Fire Prevention Bureau may submit information and evidence in support of the *fire code official's* determination. The Board shall issue a written decision based on the evidence presented at the hearing. The decision shall be signed by the Chairman of the Board, and shall be filed with the *fire code official*. A copy of the decision will be delivered to the appellant by U.S. certified mail.

112.7 Limitation and scope of authority. The Board shall have no authority relative to interpretation of the administrative provisions of this Chapter or the administrative provisions of the technical codes nor shall the Board be empowered to waive requirements of either this Chapter or the technical codes.

112.8 Liability. Neither the Board nor any member thereof shall be liable for, and the Board and each member thereof is hereby relieved from all personal liability for any damage that may accrue to persons or property as a result of any good faith act or by reason of any good faith act or omission in the discharge of any duty specified herein. Any suit brought against the Board or any member thereof resulting from such act or omission performed by them as members of the Board in the performance of their duties shall be considered an act of Clark County and shall be subject to its liability insurance coverage.

112.9 Tests and research. Appellants shall cause to be made at their own expense any tests or research necessary to support their claims before the Board.

113.4 Violation penalties – CC

[A] 113.4 Violation penalties. Persons who shall violate a provision of this code or shall fail to comply with any of the requirements thereof or who shall erect, install, alter, repair or do work in violation of the *approved construction documents* or directive of the *fire code official* or designee, or of a permit or certificate used under provisions of this code, shall be guilty of an administrative violation or a misdemeanor. Administrative violations shall be in accordance with Section 113.5. Misdemeanors shall be in accordance with Section 113.6. Each day that a violation continues after due notice has been served shall be deemed a separate offense.

113.5 Administrative violations – CC

113.5 Administrative violations. Any person violating any of the provisions, or failing to comply with any of the requirements, of Chapter 13.04 of the Clark County Code, may be issued a civil administrative citation by the *fire code official* or designee authorized to issue administrative citations, or other civil notices, for such violations.

113.5.1 Administrative procedures. The Administrative Procedures outlined in Title 1, Chapter 1.14.020-1.14.030 shall be the same procedures applicable to Chapter 13.04 of Clark County. For administrative provisions outlined in Title 1, Chapter 1.14.040-1.14.130 which refer to the "Chief of Code Enforcement", the term "Chief of Code Enforcement" shall be replaced with the term "*fire code official*".

113.5.2 Fine for administrative citations. The fines schedule for administrative citations shall be as follows:

1. For a first violation, a fine not exceeding $250.00 plus costs borne by the County.
2. For a second violation within one year of the first offense, a fine not exceeding $500.00 plus costs borne by the County.
3. For a third violation and each subsequent violation within one year of the first offense, a fine not exceeding $1,000.00 plus costs borne by the County.

113.6 Misdemeanors – CC

113.6 Misdemeanors. Any person violating any of the provisions, or failing to comply with any of the requirements, of Chapter 13.04 of the Clark County Code, may be issued a misdemeanor citation by the *fire code official* or designee authorized to issue misdemeanor citations for such violations.

113.6.1 Misdemeanor procedures. Any person issued a misdemeanor citation pursuant to this section shall be subject to criminal prosecution in the appropriate court, in accordance with the provisions of Nevada law, and may be subject to the penalties for a misdemeanor as provided in NRS 193.150, including but not limited to fines, imprisonment, or both. Any potential imprisonment shall be determined by the court.

113.6.2 Fines for misdemeanor citations. Fines for misdemeanor citations shall not exceed the maximum penalties prescribed by NRS 193.150 and shall be as follows:

1. For a first violation, a fine not exceeding $500.00 plus costs borne by the County.
2. For subsequent violations within one year of the first offense, a fine not exceeding $1,000.00 plus costs borne by the County.

114.4 Failure to comply – CC

[A] 114.4 Failure to comply. Any person who shall continue any work after being served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be subject to the provisions of Sections 113.4 through 113.6.

202 Decommissioning – SN

DECOMMISSIONING. Planned shutdown that may or may not include removal of a building, system, in whole or part, operation, or use.

202 High-rise building – CC

[BG] HIGH-RISE BUILDING. A building with an occupied floor located more than 55 feet (16 764 mm) above the lowest level of fire department vehicle access. This definition shall apply throughout this code and throughout all referenced codes and standards as stated in Section 102.7 and all applicable standards or requirements that are not set forth in this code as stated in Section 102.8.

202 Radioactive materials – CC

RADIOACTIVE MATERIALS. Materials which emit alpha or beta particles, gamma rays or neutrons and are regulated by the Nuclear Regulatory Commission and/or Nevada Division of Public and Behavioral Health Radiation Control Program.

202 Smoke control, dedicated systems – SN

SMOKE CONTROL, DEDICATED SYSTEMS. Dedicated smoke-control systems are intended for the purpose of smoke control only. They are separate systems of air moving and distribution equipment that do not function under normal building operating conditions. Upon activation, these systems operate specifically to perform the smoke control function.

202 Smoke control, non-dedicated systems – SN

SMOKE CONTROL, NON-DEDICATED SYSTEMS. Non-dedicated systems are those that share components with some other system(s) such as the building HVAC system. Activation causes the system to change its mode of operation to achieve the smoke-control objectives.

202 Main exit – SN

[BE] MAIN EXIT. Exit required at main entrance of assembly building, room or space with *occupant load* exceeding 300, where essentially all non-employees enter in the same approximate location for entry to the assembly use, such as where payment/ticketing is required for entry, where seating is accompanied by host/staff, where entry access is monitored by staff, and where the predominance of public entry is through a main entrance by building design.

203.4.2 Group E, day care facilities – SN

[BG] 203.4.2 Group E, day care facilities. This group includes buildings and structures or portions thereof occupied by more than six children older than 2½ years of age who receive educational, supervision or personal care services for fewer than 24 hours per day.

[BG] 203.4.2.1 Within places of religious worship. Rooms and spaces within *places of religious worship* providing such day care during religious functions shall be classified as part of the primary occupancy.

[BG] 203.4.2.2 Six or fewer children. A facility having six or fewer children receiving such day care shall be classified as part of the primary occupancy.

[BG] 203.4.2.3 Six or fewer children in a dwelling unit. A facility such as the above within a *dwelling unit* and having six or fewer children receiving such day care shall be classified as a Group R-3 occupancy or shall comply with the *International Residential Code.*

203.7.4 Institutional Group I-4, day care facilities – SN

[BG] 203.7.4 Institutional Group I-4, day care facilities. This group shall include buildings and structures occupied by more than six persons of any age who receive *custodial care* for less than 24 hours by persons other than parents or guardians, relatives by blood, marriage, or adoption, and in a place other than the home of the person cared for. This group shall include, but not be limited to, the following:

Adult day care

Child day care

[BG] 203.7.4.1 Classification as Group E. A child day care facility that provides care for more than six but not more than 100 children 2½ years or less of age, where the rooms in which the children are cared for are located on a *level of exit discharge* serving such rooms and each of these child care rooms have an exit door directly to the exterior, shall be classified as Group E.

[BG] 203.7.4.2 Within a place of religious worship. Rooms and spaces within *places of religious worship* providing such care during religious functions shall be classified as part of the primary occupancy.

[BG] 203.7.4.3 Six or fewer persons receiving care. A facility having six or fewer persons receiving *custodial care* shall be classified as part of the primary occupancy.

[BG] 203.7.4.4 Six or fewer persons receiving care in a dwelling unit. A facility such as the above within a *dwelling unit* and having six or fewer persons receiving *custodial care* shall be classified as a Group R-3 occupancy or shall comply with the *International Residential Code*.

203.9.3 Residential Group R-3 – SN

[BG] 203.9.3 Residential Group R-3. Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4, or I, including:

Buildings that do not contain more than two *dwelling units*

Care facilities that provide accommodations for six or fewer persons receiving care

Congregate living facilities (nontransient) with 16 or fewer occupants

Boarding houses (nontransient)

Convents

Dormitories

Emergency services living quarters

Fraternities and sororities

Monasteries

Congregate living facilities (transient) with 10 or fewer occupants

Boarding houses (transient)

Lodging houses with five or fewer guestrooms

Hotels (nontransient) with five or fewer guestrooms.

Motels (nontransient) with five or fewer guestrooms.

[BG] 203.9.3.1 Care facilities within a dwelling. Care facilities for six or fewer persons receiving care that are within a single-family *dwelling* are permitted to comply with the *International Residential Code* provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 of this code or Section P2904 of the *International Residential Code*.

307.2 Permit required – SN

307.2 Permit required. A permit shall be obtained from the *fire code official* in accordance with Section 105.5 prior to kindling a fire for recognized silvicultural or range or wildlife management practices, or prevention or control of disease or pests. Application for such approval shall only be presented by and permits issued to the *owner* of the land on which the fire is to be kindled.

307.4.1 Bonfires – SN

307.4.1 Bonfires. Bonfires are prohibited.

307.4.4 Commercial barbecue – SN

307.4.4 Commercial barbecue. Barbecue pits used for commercial cooking operations shall be constructed as commercial food heat-processing equipment in accordance with the *Uniform Mechanical Code*. Barbecue pits in outdoor locations shall be constructed of concrete or *approved* noncombustible materials and shall not be located within 10 feet (3048 mm) of combustible walls or roofs or other combustible material.

307.6 Portable and permanent outdoor fireplaces, fire pits and decorative appliances – SN

307.6 Portable and permanent outdoor fireplaces, fire pits and decorative appliances. Outdoor fireplaces, fire pits and decorative appliances fueled by LP-gas or natural gas used in assembly occupancies or for public display are to be certified by a nationally recognized testing agency. The certification shall be applicable to the entire assembly. Reference codes, standards and applicable American National Standards Institute (ANSI) shall apply.

308.1.6 Portable fueled open-flame devices – SN

308.1.6 Portable fueled open-flame devices. Portable open-flame devices fueled by flammable or combustible gases or liquids shall be enclosed or installed in such a manner as to prevent the flame from contacting combustible material.

Exceptions:

1. LP-gas-fueled devices used for sweating pipe joints or removing paint in accordance with Chapter 61.
2. Cutting and welding operations in accordance with Chapter 35.
3. Torches or flame-producing devices in accordance with Section 308.4
4. Candles and open-flame decorative devices in accordance with Section 308.1.11.
5. Portable stoves used in accordance with their listing and listed by an *approved* nationally recognized testing laboratory per ANSI Z21.72/CSA 11.2, Portable Type Gas Camp Stoves.

308.1.11 Open-flame devices – SN

308.1.11 Open-flame devices. Open-flame devices shall comply with the applicable requirements of Sections 308.1.11.1 through 308.1.11.5. Fire pits and theatrical flame effects are regulated in Sections 307 and 308.3.2 respectively.

Exception: In one- and two-family *dwellings*.

308.1.11.1 Prohibited Materials – SN

308.1.11.1 Prohibited Materials. Open-flame devices using Class I or Class II flammable liquids or toxic materials shall be prohibited. Combustible metals shall not be used or demonstrated indoors.

Exception: Fixed unvented gelled or liquid alcohol burning decorative appliances in accordance with Section 308.1.11.3.

308.1.11.2 Candles, Candle Assemblies, Oil Lamps and Tea Lights – SN

308.1.11.2 Candles, Candle Assemblies, Oil Lamps and Tea Lights. Candles, candle assemblies, oil lamps and tea lights shall comply with all of the following restrictions:

1. Liquid- or solid-fueled lighting devices containing more than 8 ounces (237 ml) of fuel must self-extinguish and not leak fuel at a rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.
2. The device or holder shall be constructed to prevent the spillage of liquid fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) when the device or holder is not in an upright position.
3. The device or holder shall be designed so that it will return to the upright position after being tilted to an angle of 45 degrees (0.79 rad) from vertical.

   Exception: Devices that self-extinguish if tipped over and do not spill fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.
4. The flame shall be fully enclosed except where openings on the side are not more than 0.375-inch (9.5 mm) diameter or where openings are on the top and the distance to the top is such that a piece of tissue paper placed on the top will not ignite in 10 seconds.
5. Holders shall be made of noncombustible materials and securely attached to the open-flame device.
6. Fuel canisters shall be safely sealed for storage.
7. Storage and handling of *combustible liquids* shall be in accordance with chapter 57.
8. Shades, where used, shall be made of noncombustible materials and securely attached to the open-flame device holder.
9. Candelabras with flame-lighted candles shall be securely fastened in place to prevent overturning, and shall be located away from occupants using the area and at least five feet (1524 mm) away from possible contact with drapes, curtains or other combustibles.

308.1.11.3 Alcohol Burning Decorative Devices – SN

308.1.11.3 Alcohol Burning Decorative Devices. Fixed unvented gelled or liquid alcohol burning decorative appliances shall be listed per UL 1370, *Standard for Unvented Alcohol Fuel Burning Decorative Appliances*.

308.1.11.4 Alcohol Burning Food Warming Devices – SN

308.1.11.4 Alcohol Burning Food Warming Devices. Food warming devices shall be used in accordance with the manufacturer's operating instructions. The fuel shall be compatible with the appliance per the manufacture's operating instructions.

308.1.11.4.1 Transport while lit. Alcohol burning food warming devices shall not be transported while lit unless secured in a holder designed for the device.

308.1.11.4.2 Shielding. Shielding that surrounds alcohol burning food warming devices shall be of non-combustible materials.

308.1.11.5 Tiki Torches – SN

308.1.11.5 Tiki Torches. Tiki torches using combustible liquid fuels shall comply with the following:

1. The torches shall be ignited and used outdoors only.
2. The torches shall not leak unburned fuel.
3. The torches shall be securely fastened to a base to prevent tipping and located a minimum of five feet (1524 mm) from combustibles.

308.3.1 Open-flame decorative devices – SN

308.3.1 Open-flame decorative devices. This section is deleted from the IFC.

314.4 Vehicles – CC

314.4 Vehicles. Liquid-fueled, or gaseous-fueled, electric or hybrid vehicles, aircraft, boats or other motorcraft shall not be located indoors except as follows:

1. The engine starting system is made inoperable, or ignition batteries are disconnected except where the *fire code official* requires that the batteries remain connected to maintain safety features.
2. Fuel in fuel tanks does not exceed any of the following:
    - 2.1. Class I, II and III liquid fuel does not exceed one-quarter tank or 5 gallons (19 L), whichever is less.
    - 2.2. LP gas does not exceed one-quarter tank or 6.6 gallons (25 L), whichever is less.
    - 2.3. CNG does not exceed one-quarter tank or 630 cubic feet (17.8 m^3), whichever is less.
    - 2.4. Hydrogen does not exceed one-quarter tank or 2,000 cubic feet (57m^3), whichever is less.
    - 2.5. Race vehicles or other vehicles that do not have fuel gauges and have sealed liquid fuel tanks, a qualified representative shall certify in writing on company letterhead that the tank will not exceed one-quarter tank or 5 gallons (19 L), whichever is less.
3. Fuel tanks and fill openings are closed and sealed to prevent tampering.
4. Vehicles, aircraft, boats or other motorcraft equipment are not fueled or defueled within the building.
5. Vehicles shall not be driven or moved through occupied places of assembly unless coordination and approval is obtained by the *fire code official* and staff on site.
6. Each vehicle shall be separated from all other vehicles by a minimum of 5 feet (1524 mm).
7. Vehicles shall be positioned no closer than 5 feet (1524 mm) from a required egress exit.
8. Electric vehicles including, but not limited to, Battery Electric Vehicles (BEV) and Plug-in Hybrid Electric Vehicles (PHEV), shall comply with the following:
    - 8.1. High voltage battery pack(s) shall have a state of charge not exceeding 30%.
    - 8.2. Vehicle charging shall not occur within buildings.
    - 8.3. Battery information (number and capacity) shall be provided to staff for each display.

315.3.2.1 Group A occupancies – SN

315.3.2.1 Group A occupancies. *Corridors* and hallways, except for 1-hour rated *corridors* used to extend travel distance to an *exit*, serving new and existing Group A Occupancies that are oversized with floor space exceeding the required egress width are permitted to contain combustible storage incidental to the use of the occupancy when all of the following are provided:

1. Maximum height of storage is 8 feet with top of storage a minimum of 18 inches below sprinkler deflectors.
2. Quick response sprinklers designed per the requirements for an ordinary hazard group II occupancy, or higher design based on the items stored and the proposed storage configuration.

3. *Approved* permanent durable floor plan(s) showing the assembly use, storage area, *corridors* and hallways are installed at a location(s) as required by the *fire code official*.
4. Plans *approved* by the *building official* identifying the minimum required width of the *corridors* or hallways.
5. When required by the *fire code official*, a fire protection report shall be submitted addressing the parameters of storage, including protection requirements, separation requirements, and description of commodity type and configuration.
6. Master egress drawings are provided to the *fire code official* and the *building official*.

The *approved* storage area shall be separated from egress by barriers. Barriers shall be a minimum of 8 feet (2438 mm) in height if walls or fencing are used. Barriers may include the following:

1. Walls
2. Fencing
3. When *approved* by the *fire code official*, *approved* permanent delineation on the floor surface of the *corridor* or hallway marking the extent of permitted storage.

The following items and operations shall be prohibited from these *corridors* and hallways:

1. *Hazardous materials* that may be moved through the back-of-house *exit access corridor* or hallway but prohibited from staging or storage: *flammable* and *combustible liquids*, highly combustible goods, LP-gas, pool chemicals, pyrotechnics, paint thinners and the like.
2. Maintenance to permanent fixtures or equipment may be temporarily performed within back-of-house *exit access corridors*. Operations that can be relocated to shop areas or not essentially required to be performed within the back-of-house *exit access corridors* are prohibited.
3. Cooking shall not be permitted within back-of-house *exit access corridors*.

315.7 Outdoor pallet storage – CC

315.7 Outdoor pallet storage. Pallets stored outdoors shall comply with Sections 315.7 through 315.7.10. Pallets stored within a building shall be protected in accordance with Chapter 32.

315.7.2 Distance to lot line – CC

315.7.2 Distance to lot line. Pallet storage shall not be located within 10 feet (3048 mm), or a distance equal to the stack height, whichever is greater, of a *lot line*.

315.7.8 Fire flow – CC

315.7.8 Fire flow. The minimum required fire flow in pallet storage yards shall not be less than that required in accordance with Appendix B, Table B105.1(2) for Type V-B construction using the aggregate area(s) of the pallet piles. Pallet storage yards shall not exceed the available fire hydrant flow and spacing.

315.7.9 Fire hydrants – CC

315.7.9 Fire hydrants. Fire hydrants required for fire flow purposes for pallet storage array(s) shall be provided within 300 feet (91 440 mm) of hose lay to all pallets.

315.7.10 Fire department access – CC

315.7.10 Fire department access. Fire apparatus access roads in accordance with Section 503 shall be located within 150 feet (45 720 mm) of all portions of the pallet storage array(s). Permanent delineation of on-site fire apparatus access roads shall be provided as required by the *fire code official*.

323 Indoor trade shows and exhibitions – SN

SECTION 323–INDOOR TRADE SHOWS AND EXHIBITIONS

323.1 General. Indoor exhibition and trade show facilities are addressed in this section. These include, but are not limited to exhibition halls, convention general sessions, association meetings, product convention showrooms, trade shows with or without booths, and political conventions that constitute temporary assembly uses. An operational permit shall be obtained in accordance with Section 105.5.15.

323.2 Exhibit Booths. Booths shall comply with 323.2.1 through 323.2.5.

323.2.1 Automatic Sprinklers

323.2.1.1 Exhibit booths exceeding 1,500 square feet (139 m^2) are not permitted in nonsprinklered buildings.

323.2.1.2 Single-level exhibit booths exceeding 1,000 square feet (93 m^2) and covered with a ceiling shall be protected by an *automatic sprinkler system* installed within the booth.

> **Exception:** Where the booth is used in an event with duration less than 7 calendar days and does not contain vehicles, open flame or hot works, automatic fire sprinklers are not required, provided the aggregate area of unsprinklered booths within the room does not exceed 30% of the room size.

323.2.1.3 Each level of multi-level exhibit booths shall be protected by an *automatic sprinkler system* installed within the booth where the accessible floor area of the upper walking level(s) is greater than 1000 square feet (93 m^2).

> **Exception:** Where the booth is used in an event with duration less than 7 calendar days and does not contain vehicles, open flame or hot works, automatic fire sprinklers are not required, provided the aggregate area of unsprinklered booths within the room does not exceed 30% of the room size.

323.2.1.4 The water supply and piping for the fire sprinkler protection for exhibit booths shall be an *approved* temporary means provided by an existing standpipe system or an existing *automatic sprinkler system*.

323.2.1.5 Where an *automatic sprinkler system* is required by Section 323.2.1, hydraulic calculations shall be provided to the *fire code official*. Hydraulic calculations shall be in accordance with NFPA 13.

323.2.2 Horizontal Separation between Booths. A covered single exhibit (booth) or group of covered exhibits (booths) that do not require fire sprinklers shall be separated by a distance of not less than 8 feet (2438 mm) from other covered exhibit booths where the aggregate ceiling exceeds 1000 square feet (93 m^2).

323.2.3 Travel Distance within Booths. The travel distance within the exhibit booth or exhibit enclosure to an *exit access* aisle shall not exceed 50 feet (15 240 mm).

323.2.4 Means of Egress from Multi-level Booths. The upper deck of multi-level exhibit booths exceeding 300 square feet (28 m^2) shall have not less than two remote means of egress.

323.2.5 Construction Materials. Exhibit booths shall be constructed using any of the following:

1. Noncombustible or limited combustible materials
2. Wood exceeding ¼ inch (6.3 mm) nominal thickness
3. Wood that is pressure-treated, fire-retardant wood meeting the requirements of NFPA 703.
4. Flame-retardant materials complying with one of the following:

4.1. They shall meet the flame propagation performance criteria contained in NFPA 701 Test Method 1 or Test Method 2, as appropriate.

4.2. They shall exhibit a heat release rate not exceeding 100 kW when tested in accordance with NFPA 289 using the 20 kW ignition source.

5. Textile wall coverings, such as carpeting and similar products used in wall or ceiling finishes complying with Section 803.5.

6. Plastics limited to a Class A flame spread index.

7. Foamed plastics and materials containing foamed plastics complying with Section 807.5.1.

8. Cardboard, honeycombed paper, and other combustible materials having a heat release rate for any single fuel package that does not exceed 150 kW where tested in accordance one of the following:

8.1. ANSI/UL 1975.

8.2. NFPA 289 using the 20 kW ignition source.

9. Alternate materials as *approved* by the *fire code official*.

323.3 Decorative Curtains, and Textiles

323.3.1 Curtains, drapes, and textiles used in temporary exhibitions and trade shows shall comply with Section 323 and shall not be required to comply with Section 807. Curtains, drapes and textiles shall comply with NFPA 701, Test Method 2. Compliance shall be indicated by a tag affixed to each curtain, drape, or textile. The tag shall be affixed by the owner of the material after gaining assurance that the material is inherently flame retardant, provided with current flame retardant treatment, or otherwise is compliant with NFPA 701. The tag shall indicate the name of the owner of the material and a statement indicating compliance with the fire code. The *fire code official* is authorized to conduct field test in accordance with the current edition of NFPA 705 on any curtain, drape or textile installed.

323.3.2 Curtains, drapes and textiles shall comply with NFPA 701, Test Method 2.

323.3.3 Curtains, drapes or textiles shall not be installed to cover exit signs, means of egress components, sprinklers, strobes, horn-strobes, standpipe outlets, hose cabinets, fire extinguishers, or any other fire protection equipment.

Exception: Free-standing partitions situated in a manner to permit the minimum required egress width to one or both sides of the partition shall be permitted. The paths of egress provided around the partition shall be marked by exit signs complying with Chapter 10.

323.3.4 Ceiling suspended curtains drapes and textiles in exhibition spaces are to have a minimum of 18 inches (457 mm) of clear space between the top of the material and the sprinkler deflector.

Exception: Clearance between the ceiling and the top of the curtain, drape or textile is not required when the curtain, drape, or textile is within 6 inches (152 mm) of a full-height wall.

323.3.5 The amount of temporary ceiling hung curtains, drapes or textiles in exhibition spaces equipped throughout with automatic sprinklers shall not be limited and shall comply with Sections 323.3.1 through 323.3.3.

323.3.6 Artificial decorative vegetation used in exhibits and trade shows shall comply Section 807.4.

323.4 Demonstration cooking and food warming in exhibition spaces shall comply with the following:

1. All cooking appliances shall be listed or *approved* by a nationally recognized testing agency.

2. All cooking equipment is to be operated according to the manufacturers' recommendations and operating instructions. Equipment recommended for outdoor use shall not be used indoors.

3. All cooking equipment (deep fat fryers and woks) operations using combustible oils shall meet all of the following criteria:

3.1. Metal lids sized to cover the horizontal cooking surface are to be provided. The cooking surface is limited to 288 square inches (0.186 m^2).

3.2. The fryer is to be separated from all other equipment by a distance not less than 24 inches (609 mm).

3.3. These cooking displays must be separated from all other combustibles by a distance not less than 10 feet (3048 mm).

3.4. Deep fat fryers shall be electrically powered and have a shut-off switch.

4. Class-K fire extinguishers shall be provided within 30 feet (9144 mm) of each cooking operation in accordance with Section 906.1(2).
5. Solid fuel cooking equipment shall be protected in accordance with the *Uniform Mechanical Code*.
6. LP-gas used for displays and demonstrations shall be in accordance with Section 6103.2.1.5.

323.5 Plans. Plans for the exhibition or trade show shall be submitted to the *fire code official* for approval, along with application for an operational permit, prior to setting up any exhibit. The plans shall show all pertinent details of the proposed exposition which shall include the following as applicable:

1. Overall floor plan (either drawn to scale or dimensioned properly).
2. Egress analysis showing conformance with Chapter 10.
3. Seating arrangements and/or table and chair configurations.
4. Locations of all exhibits (booths, aisles and exits).
5. Locations of temporary walls, partitions, or curtains.
6. Lobby and registration area usage.
7. Location of temporary platforms (along with any intended use beneath the platform).
8. Location of fire protection equipment (e.g. extinguishers, fire alarm devices, hose cabinets, etc.).
9. Temporary fire sprinkler and fire alarm system/devices to be installed (note: This requires a separate installation permit).
10. Copy of excerpt from show management information guide serving notice that all exhibits shall comply with applicable codes and shall have all necessary fire code permits.

324 Special activity lots – SN

SECTION 324–SPECIAL ACTIVITY LOTS

324.1 General. Special activity lots, including Christmas tree lots, pumpkin patches, hay ride lots, and all other similar events, shall comply with this section.

324.2 Permit required. An operational permit shall be obtained prior to commencing a special activity lot operation. See Chapter 1.

324.3 Other required permits. Other activities that support the special activity lot, such as a tent, a fuel tank for generators, an amusement building, or any other associated activity, shall have separate permits prior to commencing those other activities. See Chapter 1.

324.4 Arrangement of combustibles. Combustibles, such as Christmas trees, hay bales, and other combustible materials associated with the special activity, shall be arranged on the lot in a manner to mitigate the impact of fire, and shall be arranged in accordance with this section.

324.4.1 Access from fire apparatus access roads. Fire apparatus access roads shall be provided within 150 feet (45 720 mm) of all portions of the special activity lot, as measured along normal paths of travel.

324.4.2 Clearance from fire apparatus access roads. All combustible materials shall be a minimum of 10 feet (3048 mm) away from fire apparatus access roads.

324.4.3 Clearance from property lines upon which buildings may be built. All combustible materials shall be a minimum of 20 feet (6096 mm) from property lines for property where buildings are or are permitted to be built.

324.4.4 Clearance from fuel dispensers. All combustible materials shall be a minimum of 50 feet (15 240 mm) away from any fuel dispenser.

324.4.5 Clearance from buildings, building exits, and building exit discharges to the public way. All combustible materials shall be a minimum of 10 feet (3048 mm) from any building, building *exit*, and the path of discharge between the building *exit* and the *public way*.

324.4.6 Aisles between materials. Aisles having a minimum width of 5 feet (1524 mm) shall be provided between areas containing materials. Sufficient aisles shall be provided such that the area of material storage does not exceed 150 feet (45 720 mm) in length and 50 feet (15 240 mm) in width.

324.5 Wiring and lighting. All wiring and lighting shall be listed for outside use, be of proper size and type, and be protected against physical damage. Electrical extension cords with multiple electrical outlets cannot be used unless specifically listed for outdoor use.

324.6 Fire Protection. Fire protection features, such as fire extinguishers and water supply, shall be provided for special activity lots as required by this section.

324.6.1 Fire extinguisher. A minimum two 2 ½ gallon water-type fire extinguisher shall be provided at an *approved* location for protection against incipient fires.

324.6.2 Water supply. The special activity lot shall be located within 300 feet (91 440 mm) of a fire hydrant unless otherwise *approved* by the *fire code official*.

324.6.3 Smoking prohibited. Smoking is prohibited on special activity lots. “NO SMOKING” signs with 2-inch (24 mm) high letters on a contrasting background shall be posted at entrances to the special activity lot and to each aisle.

324.6.4 Open burning prohibited. *Open burning*, such as a campfire is prohibited on special activity lots.

324.6.5 Open flame. Open flame or other devices emitting flame, fire, or heat or any flammable or combustible liquids, gas, charcoal, or other cooking device or any other unapproved devices shall not be permitted inside or located within 20 feet (6096 mm) of the special activity lot, unless *approved* by the *fire code official*.

324.7 Egress. Egress shall be provided as required by this code.

401.2 Approval – CC

401.2 Approval. Where required by this code, fire safety plans, emergency procedures and employee training programs shall be *approved* by the *fire code official*.

Submittals shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the *fire code official*. The cover sheet of the submittal shall include a signature line by the preparer with the following statement:

“I have prepared this report and by personal knowledge and on-site observation certify that this plan, to the best of my knowledge, complies with the requirements of the fire code.”

401.9 Fees for false alarms and nuisance alarms – CC

401.9 Fees for false alarms and nuisance alarms. In the case of any two false or nuisance alarms, or combination thereof, within a thirty-day period, the *fire code official* may issue warning notices to the owners or occupants of the building and to the alarm business or businesses responsible for the service, maintenance and monitoring of the system. This notice shall indicate that any additional false or nuisance alarms within a thirty-day period will be subject to the fees prescribed in this code. When the owner or occupant fails to correct the *fire protection system* that initiates false alarms and/or nuisance alarms within thirty calendar days from the issue date on a Notice of Violation prepared by the *fire code official*, additional inspection fees shall apply.

403.11 Special requirements for public safety – CC

403.11 Special requirements for public safety. Special requirements for public safety shall be in accordance with Sections 403.11.1 through 403.11.4.

403.11.2 Public safety plan for gatherings – CC

403.11.2 Public safety plan for gatherings. Where the *fire code official* determines that an indoor or outdoor gathering of persons has an adverse impact on public safety through diminished access to buildings, structures, fire hydrants and fire apparatus access roads or where such gatherings adversely affect public safety services of any kind, the *fire code official* shall have the authority to order the development of or prescribe a public safety plan that provides an *approved* level of public safety and addresses the following items:

1. Emergency vehicle ingress and egress.
2. Fire protection.
3. Emergency egress or escape routes.
4. Emergency medical services.
5. Public assembly areas.
6. The directing of both attendees and vehicles, including the parking of vehicles.
7. Vendor and food concession distribution.
8. The need for the presence of law enforcement.
9. The need for fire and emergency medical services personnel.
10. The need for a weather monitoring person.
11. Additional items required by the *fire code official*.

403.11.4 Mass casualty incidents – CC

403.11.4 Mass casualty incidents. Any entity subject to this code shall disseminate all information provided by Clark County and/or the Legal Aid Center of Southern Nevada Resiliency & Justice Center. This dissemination shall occur within 10 calendar days of the written request being sent to the entity. Upon receipt of the request, the information must be disseminated through all reasonable means available to the entity, including but not limited to email, telephone, social media, text message, etc. The dissemination must be sent to all of those personally involved (e.g., performers/crew, ticket holders/spectators, staff/employees, vendors, etc.) in the mass casualty incident, as declared by the Clark County Emergency Manager or the Clark County Fire Chief.

This section does not apply to any methods of dissemination that would violate any applicable privacy laws.

503.1.1 Buildings and facilities – CC

503.1.1 Buildings and facilities. *Approved* fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire apparatus access road shall comply with the requirements of this section and shall extend to within 150 feet (45 720 mm) of all portions of the facility and all portions of the *exterior walls* of the first story of the building as measured by an *approved* route around the exterior of the building or facility.

The use of section and half-section public streets in meeting the apparatus access requirements of this section for commercial buildings exceeding 500 total occupant load or 30,000 square feet (2787 m^2) in building area shall be *approved* by the *fire chief*.

Exceptions:

1. The *fire code official* is authorized to increase the dimension of 150 feet (45 720 mm) where any of the following conditions occur.

    1.1. The building, except for a group H and/or high-pile storage occupancy where the area of compartment(s) containing the high-pile storage area(s) is greater than 50% of building area, is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2, or 903.3.1.3.

    1.1.1. Where the building is protected in accordance with Section 903.3.1.1, Section 903.3.1.2, or Section 903.3.1.3 with an *approved automatic sprinkler system* in accordance with minimum requirements, the fire apparatus roads shall extend to within 250 feet (76 200 mm) of all portions of the facility and all portions of the *exterior walls* of the first story of the building.

    1.1.2. For residential buildings designed to Section 903.3.1.3 that request extend distance from fire apparatus lane to all portions of the *exterior walls* of the first story of the building to 350 feet or beyond, see NFPA 13D Section 8.4.

    1.1.3. Where the building is protected in accordance with Section 903.3.1.1 or Section 903.3.1.2 with an *approved* upgraded *automatic sprinkler system*, in accordance with subsections 1.1.3.1 through 1.1.3.3, the fire apparatus roads shall extend to within 350 feet (106 680 mm) of all portions of the facility and all portions of the *exterior walls* of the first story of the building.

    1.1.3.1. Density/Area Designs: Where the minimum sprinkler design is described in terms of density (gpm/sf) and area (sf), an upgraded system shall achieve an increase in density of 30% and also an increase in remote area of 50%. The 50% remote area increase applies to the design area after applicable remote area increases/reductions such as dry system increases, sloped ceiling increases, quick-response head reductions, and room design methods as described in NFPA 13 Section 19.2.3.3 or 29.2.4.2.5.

1.1.3.2. Head Count and/or Sprinkler Discharge Pressure: Where the minimum sprinkler design is modified from density/area by either specifying head count of calculation and/or sprinkler head design pressure, an upgraded system shall be modified from above to achieve an increase in sprinkler head count of 30%, rounded to the next higher whole number of heads, and/or a sprinkler discharge pressure increase of 100%, as is applicable, including but not limited to designs such as described in NFPA 13R, NFPA 13 Special Design Areas, and those designs for Control Mode Special Application (CMSA) and Early Suppression-Fast Response (ESFR) systems.

1.1.3.3. Where an upgraded sprinkler system is proposed during civil improvement design of fire apparatus access lanes, the submittal shall be accompanied by an *approved* fire protection report that establishes the required sprinkler design and flow rate. The sizing of water supply lines, backflow prevention devices, and water supply components such as water tanks, fire pumps, and sprinkler risers shall be selected to accommodate the flow rate established by the fire protection report.

1.2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, nonnegotiable grades or other similar conditions, and an *approved* alternative means of fire protection is provided.

1.3. There are not more than two Group R-3 or Group U occupancies.

2. Where *approved* by the *fire code official*, fire apparatus access roads shall be permitted to be exempted or modified for solar photovoltaic power generation facilities.

3. For buildings constructed in accordance with high-rise provisions of Type I or Type II construction, fire access along two adjoining sides of the building shall be permitted.

503.2.1 Fire access road dimensions – SN/CC

503.2.1 Fire access road dimensions. Fire apparatus access roads shall have an unobstructed width of not less than 24 feet (7315 mm), exclusive of shoulders, except for *approved* access gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than 13 feet 6 inches (4115 mm).

503.2.1.1 Use group R-3 residential street widths – CC

503.2.1.1 Use group R-3 residential street widths. Street widths within residential subdivisions and developments shall have minimum widths, based on curb type, as measured from the backs of curb in accordance with Table 503.2.1.1.

TABLE 503.2.1.1 – USE GROUP R-3 RESIDENTIAL STREET WIDTHS	
TYPE OF CURB	**MINIMUM STREET WIDTH (feet)**
L-Curb	37
R-Curb	38
Roll Curb	39
For SI: 1 foot = 304.8 mm.	

503.2.1.2 Use group R-3 stub street widths – CC

503.2.1.2 Use group R-3 stub street widths. A stub street serving a maximum of six single family residences constructed in accordance with the *International Residential Code* and having a maximum length of 150 feet (45 720 mm), as measured from the intersection to the end of the stub street, shall be permitted to have a minimum street width of 25 feet (7620 mm), as measured from the back of curb to the back of curb, provided on-street parking on the stub street is prohibited.

503.2.1.3 Use group R-3 flag lot street widths – CC

503.2.1.3 Use group R-3 flag lot street widths. The drive aisle leading to one use group R-3 structure shall be an all-weather (paved) surface that is a minimum of 20 feet (6096 mm) in width and of unlimited length.

503.2.1.4 All use groups street widths – CC

503.2.1.4 All use groups street widths. Streets widths in other than residential subdivisions and developments shall have minimum widths, based on curb type and parallel parking allowance, as measured from the backs of the curb in accordance with Table 503.2.1.4.

TABLE 503.2.1.4 – ALL USE GROUPS STREET WIDTHS			
TYPE OF CURB	**MINIMUM STREET WIDTH, PARALLEL PARKING PROHIBITED ON BOTH SIDES (feet)**	**MINIMUM STREET WIDTH, PARALLEL PARKING PROHIBITED ON ONE SIDE (feet)**	**MINIMUM STREET WIDTH, PARALLEL PARKING NOT PROHIBITED (feet)**
L-Curb	25	31	37
R-Curb	26	32	38
Roll Curb	27	33	39
For SI: 1 foot = 304.8 mm.			

503.2.1.5 Parking lot drive aisles – CC

503.2.1.5 Parking lot drive aisles. Parking lot drive aisles shall be a have a minimum of 24-foot (7315 mm) clear width.

503.2.1.6 Intermingling of pedestrian walkways – CC

503.2.1.6 Intermingling of pedestrian walkways. Where fire apparatus access roads and pedestrian walkways are *approved* by the *fire code official* to intermingle, a minimum of 5 feet (1524 mm) of pedestrian walkway shall be added to both sides of the fire apparatus access road.

503.2.3 Surface – SN

503.2.3 Surface. Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus, with a minimum vehicle load of 33,000 pounds (15 000 kg) per axle and shall be surfaced and paved so as to provide all-weather driving capabilities.

> **Exception:** Temporary access roads serving only buildings under construction shall not be required to be paved.

503.2.4 Turning Radius – SN

503.2.4 Turning Radius. The required turning radius of a fire apparatus access road shall be no less than 28 feet (8534 mm) inside turning radius and 52 feet (15 850 mm) outside turning radius.

503.2.7 Grade – SN

503.2.7 Grade. The grade of the fire apparatus access road shall not exceed 12 percent (0.12 rad.) The maximum cross-slope curve shall not exceed 2 percent (0.02 rad.) unless otherwise *approved* by the *fire code official*.

503.2.8 Angles of approach and departure – SN

503.2.8 Angles of approach and departure. The angles of approach and departure for fire apparatus access roads shall have a maximum grade change of 6 percent (0.06 rad.) for 25 feet (7620 mm) before or after the grade change.

503.2.9 Fire apparatus point load – SN

503.2.9 Fire apparatus point load. Fire apparatus access roads including elevated portions shall be designed with a ground bearing capacity not less than 75 psi (500 kPa) over the ground contact area.

503.2.10 Aerial fire apparatus access roads – SN

503.2.10 Aerial fire apparatus access roads.

503.2.10.1 Where required. Where the vertical distance between the *grade plane* and the highest roof surface exceeds 30 ft (9144 mm), *approved* aerial fire apparatus access roads shall be provided. For the purpose of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the *exterior wall*, or the top of a parapet walls, whichever is greater.

> **Exception:** Where *approved* by the *fire code official*, buildings of Type IA, Type IB or Type IIA construction equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 and having fire fighter access through an enclosed *stairway* with a Class I standpipe from the lowest level of fire department vehicle access to all roof surfaces.

503.2.10.2 Width. Aerial fire apparatus access roads shall have a minimum unobstructed width of 26 feet (7925 mm), exclusive of shoulders, in the immediate vicinity of the building or portion thereof.

503.2.10.3 Proximity to building. One or more of the required access routes meeting this condition shall be located not less than 15 feet (4572 mm) and not greater than 30 feet (9144 mm) from the building and shall be positioned parallel to one entire side of the building. The side of the building on which the aerial fire apparatus access road is positioned shall be *approved* by the *fire code official*.

503.2.10.4 Obstructions. Overhead utility, power lines, trees, carports and canopies shall not be located over the aerial fire apparatus access road or between the aerial fire apparatus road and the building. Other obstructions shall be permitted to be placed with the approval of the *fire code official*.

503.3 Marking – SN

503.3 Marking. Fire apparatus access roads shall be marked where required to prohibit parking and other obstructions. Fire lane marking shall be consistent with one of the following packages.

Type A Package: Marking shall consist of painting the curb, or street surface, where no curb is present, with a suitable coat of industrial red enamel along the entire fire apparatus access lane where parking or obstructions are prohibited. All curb that is painted red shall also be marked by signage stating “NO PARKING FIRE LANE” (Type A package). Signs are to be installed no higher than 10 feet (3048 mm) or less than 6 feet (1830 mm) from the surface of the roadway. Signs shall be located at each end of painted curb, and additionally in between so that the maximum separation between signs is 100 feet (30 480 mm), as measured along the centerline of the fire apparatus access road.

Type B Package: Minimum of one sign is provided at every entrance stating “ON-STREET PARKING IN MARKED FIRE LANES PROHIBITED” (Type B package), fire lanes shall be marked by painting the words “NO PARKING FIRE LANE” (Curb/surface marking), over the face of the red-painted curbs or street surface where no curbs are present. The words on the curbs shall be painted in white letters not less than 4 inches (102 mm) in height with a brush stroke of not less than ¾ inch (19 mm). The maximum separation between markings shall be 50 feet (15 240 mm), as measured along the centerline of the fire apparatus access lane.

503.3.1 Sign Specifications. Where required by the *fire code official* signs shall be in accordance with one of the following packages:

Type A Package: Minimum dimension of 18 inches (457 mm) high by 12 inches (305 mm) wide. Red letters on a reflective white background with 3/8 inch (9.6 mm) red trim around entire outer edge of sign. Lettering shall be: “FIRE LANE”, see following exhibit.

Type B Package: Minimum dimension of 18 inches (457 mm) high by 24 inches (610 mm) wide. Red letters on reflective white background with 3/8 inch (9.6 mm) red trim strip around the entire outer edge of sign. Lettering on sign shall be: “ON STREET PARKING IN MARKED FIRE LANES PROHIBITED”. Curb/Surface Markings: Minimum dimension of 36 inches (914 mm) wide by 4 inches (102 mm) high. White letters on red enamel background. Lettering on curb shall be: “NO PARKING FIRE LANE”, see following exhibit.

Signs shall be installed not less than 6 feet (1830 mm) and not more than 10 feet (3048 mm) from the ground level. Posts for signs shall be metal and securely mounted, unless written permission for alternatives is obtained prior to installation from the *fire code official*.

Type A Package	Type B Package

503.4.1 Traffic calming devices – SN/CC

503.4.1 Traffic calming devices. Traffic calming devices shall be prohibited unless *approved* by the *fire code official*.

Exceptions:

1. Speed humps are allowed on private fire apparatus access roads serving commercial and industrial buildings when *approved* by the *fire code official*. The location(s), the number permitted, and the design of the speed hump(s) shall meet the *approval* of the *fire code official*.
2. Rumble strips are allowed on private fire apparatus access roads serving residential, commercial and industrial buildings when *approved* by *the fire code official*. A rumble strip must be no higher than ¾ inches (19 mm) at the highest elevation above the roadway, and a maximum of 8 feet (2438 mm) in length, as measured along the direction of vehicle travel.

The *fire code official* is authorized to require the removal from any private property of any existing traffic management or calming device, including speed bumps that do not meet the applicable criteria, and has been determined by the *fire code official* to unnecessarily hinder emergency apparatus response.

503.4.2 Bollards – CC

503.4.2 Bollards. Bollards obstructing fire apparatus access roads shall be prohibited unless *approved* by the *fire code official*.

Exception: Automated bollards *approved* by the *fire code official*. The location(s), the number permitted, and the activation method shall be *approved* by *the fire code official*. An operational test shall be conducted prior to placing the system into operation using fire department apparatus.

The *fire code official* is authorized to require the removal from any private property any existing bollards that do not comply with this section and has been determined by the *fire code official* to unnecessarily hinder emergency apparatus response.

503.6 Access gates – SN

503.6 Access gates. The installation of access gates across a fire apparatus access road shall be *approved* by the *fire code official*. Where access gates are installed, they shall have an *approved* means of emergency operation. The access gates and the emergency operation shall be maintained operational at all times. The minimum clear opening width shall be 20 feet. Electric gate operators, where provided, shall be *listed* in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed, and installed to comply with the requirements of ASTM F2200.

503.6.1 Permit. A construction permit is required to install a gate that obstructs a fire apparatus access road in accordance with Section 105.6.12. A separate permit is required for each gated entrance.

503.6.2 General. Fire apparatus access roads that are secured by gates shall comply with the specifications of the Fire Department.

503.6.3 Electronically controlled gates. Electronically controlled gates shall be provided with the following in accordance with the rules and regulations specified by the Fire Department:

1. An *approved* vehicle detector/receiver system.
2. An *approved* key switch override configured as a two-position toggle switch when required by the *fire code official*.

Access gates shall be maintained operational at all times. When electronically controlled gates are out of service, they shall be secured in the open position until repairs are complete. Repairs shall be in accordance with original specifications.

> **Exception:** When *approved* by the *fire code official*, electronically controlled gates that are manned on a 24-hour basis.

When required by the *fire code official*, the installing contractor or the *owner* of the property shall provide the Fire Department transmitter(s) or *approved* alternative without cost to the Fire Department. The *fire code official* may provide transmitter(s), at no cost to the Fire Department, to local law enforcement agencies and/or an ambulance service for use in emergencies.

503.6.4 Existing facilities. All existing facilities with gates installed across access roads shall comply with Fire department guidelines. Non-complying gates shall be secured in the open position in a manner *approved* by the Fire Department and/or *fire code official*.

> **Exception:** Gates securing sensitive facilities operated by a public utility governed by the Nevada Public Service Commission, a State of Nevada charter, or other public franchise, shall not be required to be secured in the open position.

503.6.5 Plans and Specification. Plans and specifications for fire apparatus access road gates shall be submitted for review and approval prior to construction. The following information shall be included in the submittal:

1. Site plan with north arrow, roadway and gate dimensions
2. Location of underground roadway detector loop, and green marker, if applicable
3. Manufacturers' specification sheets detailing the voltage, current, radio frequency, power cable and coding for the proposed system, if applicable
4. Contractor's statement of compatibility with existing installations
5. Detailed vicinity map.
6. *Approved* civil plans showing gate and hydrant location(s).

503.6.6 Operational testing. An operational test shall be requested by the installing contractor and shall be conducted prior to placing the system into operation to establish that the final installation complies with this code, the specified design, and is functioning properly.

505.1 Address identification – SN

505.1 Address identification. New and existing buildings shall be provided with *approved* address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Where required by the *fire code official*, address identification shall be provided in additional *approved* locations to facilitate emergency response. Address identification shall be in compliance with the requirements of the *fire code official* and the ordinances of the jurisdiction. Where access is by means of a private road and the building cannot be viewed from the *public way*, a monument, pole or other sign or means shall be used to identify the structure. Address identification shall be maintained.

505.3 Directory required – SN

505.3 Directory required. When multiple R-2 occupancy buildings are contained in a subdivision and where not all buildings have public street frontage, an *approved* permanent directory shall be provided at each entrance to the development from surrounding public streets.

506.1 Where required – CC

506.1 Where required. Key boxes shall be installed in accordance with Sections 506.1.3 and 506.1.4. Where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for life-saving or firefighting purposes, the *fire code official* is authorized to require a key box to be installed in an *approved* location. The key box shall be of an *approved* type listed in accordance with UL 1037, and shall contain keys to gain necessary access as required by the *fire code official*.

The key box shall be located, in order of preference: at the *fire command center* (when equipped); fire sprinkler riser room (when equipped); or at the main entrance to the structure.

506.1.3 New buildings and structures – CC

506.1.3 New buildings and structures. An *approved* key box shall be installed in all new buildings and structures.

Exceptions:

1. Where such building(s) is staffed by security personnel that have keys and complete access 24 hours a day for fire crews.
2. One- or two-family *dwellings* and *townhouses*.

506.1.4 Existing buildings and structures – CC

506.1.4 Existing buildings and structures. An *approved* key box shall be installed as required by the *fire code official* for all existing buildings within one year of being notified of such requirement.

Exceptions:

1. Where such building(s) is staffed by security personnel that have keys and complete access 24 hours a day for fire crews.
2. One- or two-family *dwellings* and *townhouses*.

507.1 Required water supply – SN

507.1 Required water supply. An *approved* water supply capable of supplying the required fire flow for fire protection shall be provided to premises on which facilities, buildings, or portions of buildings are hereafter constructed or moved into or within the jurisdiction. The design and installation of both public and private fire hydrants shall be in accordance with this section, Appendix B, Appendix C, NFPA 24 (for private systems) and the Uniform Design And Construction Standards for Potable Water Systems (UDACS) (for public systems). Unless otherwise *approved* by the *fire code official*, effluent reuse water is not an *approved* water supply.

507.2.1 Private fire service mains – CC

507.2.1 Private fire service mains. Private fire service mains and appurtenances shall be installed in accordance with NFPA 24 and Appendix C.

507.4 Water supply test – CC

507.4 Water supply test. The *fire code official* shall be notified prior to water supply test. Water supply tests shall be witnessed by the *fire code official* prior to final approval of the water supply system.

507.5 Fire hydrant systems – SN/CC

507.5 Fire hydrant systems. Fire hydrant systems shall comply with Sections 507.5.1 through 507.5.8 and Appendix C.

507.5.1 Where required – CC

507.5.1 Where required. Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 300 feet (91 m) from a hydrant on a fire apparatus access road, as measured by an *approved* route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the *fire code official*.

Exceptions:

1. For Group R-3 and Group U occupancies constructed in accordance with the *International Residential Code*, the distance requirement shall be 500 feet (152 m).
2. For buildings equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the distance requirement shall be 400 feet (122 m).

507.5.1.1 Hydrant for fire sprinkler or standpipe systems – CC

507.5.1.1 Hydrant for fire sprinkler or standpipe systems. Buildings equipped with an *automatic sprinkler system* or standpipe system installed in accordance with Sections 903.3.1.1, 903.3.1.2, or 905 shall have a fire hydrant within 100 feet (30 480 mm) of the fire department connections.

Exception: The distance shall be permitted to exceed 100 feet (30 480 mm) where *approved* by the *fire code official*.

507.5.7 Painting and markings – SN

507.5.7 Painting and markings. Hydrants and curbs shall be painted, and hydrant locations shall be marked in accordance with this section.

507.5.7.1 Hydrant painting. On-site private fire hydrants shall be painted with a suitable prime coat and not less than two coats of exterior industrial grade enamel, safety red in color.

507.5.7.2 Curb and roadside painting. The curb, or roadside where no curb is present, adjacent to a fire hydrant shall be painted to restrict parked cars from obstructing access to the fire hydrants. A coat of exterior industrial grade enamel, safety red in color, shall be applied for a minimum of 30 feet (9144 mm), 15 feet (4572 mm) to each side of the hydrant, unless the curb or roadside is interrupted by a driveway, at which point the paint shall end at the driveway.

507.5.7.3 Lane marking. Hydrant locations shall be marked by means of a blue colored reflective marker in the fire access lane. The marker shall be located in the center of a drive lane where the parking is not anticipated, nearest to the hydrant.

507.5.8 Hydrant locks on private hydrants – CC

507.5.8 Hydrant locks on private hydrants. Hydrant locks consisting of Knox locking caps and/or Knox plugs are permitted to be installed on private hydrants for the purpose of securing private hydrants to prevent the theft of water.

507.6 Backflow prevention device replacement – CC

507.6 Backflow prevention device replacement. This section shall apply where the replacement of a backflow prevention device at the connection from the public water system to a private on-site water system occurs.

507.6.1 Equal flow characteristics – CC

507.6.1 Equal flow characteristics. Where a new backflow prevention device has equal or lower pressure losses throughout the range of flows, a comparative analysis in accordance with Section 507.6.1.1 shall be provided with the submittal. No hydraulic analysis of the onsite *automatic sprinkler systems* or automatic standpipe systems is required.

507.6.1.1 Comparative Analysis. A comparative analysis shall include manufacturer documentation for both the existing and new device, water purveyor approvals for the existing and new device types, and narrative highlighting how the new device provides, throughout the entire flow range, equal or lower pressure losses than the existing device being replaced.

507.6.2 Degraded flow characteristics – CC

507.6.2 Degraded flow characteristics. Where the new backflow prevention device has a greater pressure loss at any point throughout the range of flows, a hydraulic analysis of all onsite *automatic sprinkler systems* and automatic standpipe systems in accordance with Section 507.6.2.1 shall be provided with the submittal.

507.6.2.1 Hydraulic Analysis. A hydraulic analysis shall be provided for each *automatic sprinkler system* and automatic standpipe system served by the new backflow prevention device. Hydraulic analyses shall be in accordance with NFPA 13 and shall include hydraulic calculations, and necessary supporting documentation such as base of riser placards, previous plan approvals, newly created design drawings, manufacturer spec sheets, current water supply information, references to elevations, etc. Such hydraulic analyses shall be prepared by individuals meeting the requirements of Section 901.2.2, as amended.

508.1 General – SN

508.1 General. Where required by other sections of this code and in all buildings classified as high-rise buildings by the *International Building Code* and in all F-1 and S-1 occupancies with a building footprint greater than 500,000 square feet (46 452 m^2), a *fire command center* for fire department operations shall be provided and shall comply with Sections 508.1.1 through 508.1.7. When required, a secondary response point shall comply with Section 508.2.

508.1.6 Required features – SN

508.1.6 Required features. The *fire command center* shall comply with NFPA 72 and shall contain the following features:

1. The emergency voice/alarm communications system control unit.
2. The fire department communications system.
3. Fire detection and alarm system graphic annunciator or a method *approved* by the *fire code official*.
4. Annunciator unit visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air distribution systems.
6. The firefighter's control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking *interior exit stairway* doors simultaneously.
8. Sprinkler valve and waterflow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, *means of egress*, *fire protection systems*, firefighter air-replenishment systems, firefighting equipment and fire department access, and the location of *fire walls*, *fire barriers*, *fire partitions*, *smoke barriers* and smoke partitions.
13. An *approved* Building Information Card that includes, but is not limited to, all of the following information:
    - 13.1. General building information that includes: property name, address, the number of floors in the building above and below grade, use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor) and the estimated building population during the day, night and weekend.
    - 13.2. Building emergency contact information that includes: a list of the building's emergency contacts including but not limited to building manager, building engineer and their respective work phone number, cell phone number and email address.
    - 13.3. Building construction information that includes: the type of building construction including but not limited to floors, walls, columns and roof assembly.

13.4. *Exit access stairway* and *exit stairway* information that includes: number of *exit access stairways* and *exit stairways* in building; each *exit access stairway* and *exit stairway* designation and floors served; location where each *exit access stairway* and *exit stairway* discharges, *interior exit stairways* that are pressurized; *exit stairways* provided with emergency lighting; each *exit stairway* that allows reentry; *exit stairways* providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve; location of elevator machine rooms, control rooms and control spaces; location of sky lobby; and location of freight elevator banks.

13.5. Building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator and location of natural gas service.

13.6. *Fire protection system* information that includes: location of standpipes, location of fire pump room, location of fire department connections, floors protected by automatic sprinklers and location of different types of *automatic sprinkler systems* installed including but not limited to dry, wet and pre-action.

13.7. Hazardous material information that includes: location and quantity of hazardous material.

14. A means for viewing full size plans shall be provided in accordance with one of the following:

    14.1. A new worktable with a minimum size of three 3 feet (914 mm) by seven 7 feet (2134 mm) capable of holding plans in an open position.

    14.2. A method *approved* by the *fire code official*.

15. Generator supervision devices, manual start and transfer features.

16. Public address system, where specifically required by other sections of this code.

17. Elevator fire recall switch in accordance with ASME A17.1/CSA B44.

18. Elevator emergency or standby power selector switch(es) in accordance with ASME A17.1/CSA B44.

19. An *approved* whiteboard with a minimum size of three 3 feet (914 mm) by four 4 feet (1219 mm) capable of easy erasure with a marking device and an eraser attached.

20. Separate shunt trip switches for normal and emergency power.

21. A means for viewing and recording all fire alarm, supervisory, and trouble signals shall be provided in accordance with one of the following, and shall be connected to a UPS battery system and/or an emergency power supply:

    21.1. A printer connected to the fire alarm control panel.

    21.2. A method *approved* by the *fire code official*.

22. Emergency power and lighting.

508.2 Secondary response point – SN

508.2 Secondary response point. A Secondary Response Point (SRP) shall be provided in accordance with Sections 508.2.1 through 508.2.3.

508.2.1 Where required. When required by the *fire code official*, an SRP shall be provided in buildings/facilities that are required to be served by a *fire command center*.

508.2.2 Components required. The SRP shall have the following components:

1. A fire alarm LCD annunciator that provides a means to scroll through the list of devices that are activated and to acknowledge each alarm. The fire alarm annunciator shall not have the capability of silencing or resetting the building *fire alarm system*.
2. A microphone capable of providing all-call voice messaging over all notification appliance circuits of the alarm communication system.
3. A pull station capable of evacuating the entire building.
4. An elevator panel that allows the manual transfer of standby power to each elevator cab for all elevators located within the building.

   Exception: Where an elevator panel allowing manual transfer of standby power for all elevators is provided at the *fire command center*, an elevator panel is not required at the SRP.

508.2.3 Location. The SRP shall be located as follows, subject to the approval of the *fire code official*:

1. The SRP shall be located on the floor designated for primary elevator recall.
2. The exterior entrance leading to the SRP shall be adjacent to the fire apparatus access lane.
3. The SRP shall be located in an area inaccessible to the public.
4. The SRP shall be located within a travel distance of 200 feet (60 960 mm) from the building entry.
5. The entrance to the SRP shall be separated from the *fire command center* a minimum distance equal to 25% of the building perimeter, or a minimum of 250 feet (76 200 mm), as measured along the building perimeter.

510 Emergency Responder Communications Enhancement Systems – SN/CC

SECTION 510–EMERGENCY RESPONDER COMMUNICATIONS ENHANCEMENT SYSTEMS

In-building emergency responder communications enhancement systems (ERCES) shall be in accordance with this section and the *Clark County Fire Department Guideline for Emergency Responder Communications Enhancement Systems Permitting, Testing, & Recertification*.

510.1 Emergency responder communications enhancement systems in new buildings – SN

510.1 Emergency responder communications enhancement systems in new buildings. *Approved* in-building emergency responder communications enhancement system (ERCES) for emergency responders shall be provided in all new buildings. In-building ERCES within the building shall be based on the existing coverage levels of the public safety communications systems utilized by the jurisdiction, measured at the exterior of the building. The ERCES, where required, shall be of a type determined by the *fire code official* and the *frequency license holder(s)*. This section shall not require improvement of the existing public safety communications systems.

Exceptions:

1. Where *approved* by the building official and the *fire code official*, a wired communications system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained instead of an *approved* communications coverage system.
2. Where it is determined by the *fire code official* that the communications coverage system is not needed.
3. In facilities where emergency responder communications coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the *fire code official* shall have the authority to accept an automatically activated emergency responder communications coverage system.

4. One-story buildings not exceeding 12,000 square feet (1115 m^2) with no below-ground area(s). Unless determined by the *fire code official* that a communications coverage system is required.

510.2 Emergency responder communications enhancement system in existing buildings – SN

510.2 Emergency responder communications enhancement system in existing buildings. Existing buildings other than Group R-3 that do not have *approved* in-building emergency response communications enhancement for emergency responders in the building based on existing coverage levels of the public safety communication systems, shall be equipped with such coverage according to one of the following:

1. Where an existing wired communication system cannot be repaired or is being replaced, or where not *approved* in accordance with Section 510.1, Exception 1.
2. Within a timeframe established by the adopting authority.

Exception: Where it is determined by the *fire code official* that the in-building emergency responder communications enhancement system is not needed.

510.3.2 Operational permit – SN

510.3.2 Operational permit. An operational permit is required as specified in Section 105.5.60 for the operation of an in-building emergency responder communications enhancement system.

510.4.1.1 Minimum signal strength into the building – SN

510.4.1.1 Minimum signal strength into the building. The minimum *downlink* signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the *fire code official*. The *downlink* signal level shall be a minimum of -95dBm throughout the coverage area and sufficient to provide not less than a Delivered Audio Quality (DAQ) of 3.0 throughout the coverage area using either narrowband analog, digital or wideband LTE signals or an equivalent bit error rate (BER), or signal-to-interference-plus-noise ratio (SINR) applicable to the technology for either analog or digital signals.

510.4.2.2 Technical criteria – SN/CC

510.4.2.2 Technical criteria. The *fire code official* shall maintain a document providing the specific technical information and requirements for the in-building emergency responder communications enhancement system. This document shall contain, but not be limited to, the various frequencies required, the location of radio sites, the effective radiated power of radio sites, the maximum propagation delay in microseconds, the applications being used and other supporting technical information necessary for system design. This information shall be located in the *Clark County Fire Department Guideline for Emergency Responder Communications Enhancement Systems Permitting, Testing, & Recertification*.

510.4.2.3 Standby power – SN

510.4.2.3 Standby power. In-building emergency responder communications enhancement systems shall be provided with dedicated standby batteries or provided with 4-hour standby batteries and connected to the facility generator power system in accordance with Section 1203. The standby power supply shall be capable of operating the in-building emergency responder communications enhancement system at 100-percent system capacity for a duration of not less than 12 hours.

510.4.2.10 Pathway survivability – SN

510.4.2.10 Pathway survivability. The system shall be designed with a designated pathway survivability as described in NFPA 1225 Sections 18.12.3.3 and 18.12.3.4.

The *fire code official* shall have the authority to require a fire and non-fire risk analysis be prepared to specify and document the pathway survivability design and installation requirements.

510.4.2.11 Cable – SN

510.4.2.11 Cable.

510.4.2.11.1 Cable shall be contained in a non-combustible raceway, metal-clad, or fully enclosed cable tray system.

> **Exception:** If *approved* by the *fire code official*, where leaky feeder cable is utilized as the antenna, it shall not be required to be installed in metal raceway.

510.4.2.11.2 Cable shall have a passband of 700-900 MHz.

510.5.3 Minimum qualifications of personnel – SN

510.5.3 Minimum qualifications of personnel. The minimum qualifications of the system designer and lead installation personnel shall include both of the following:

A valid FCC-issued general radio operator's license.

Certification of in-building system training issued by an *approved* organization or *approved* school, or a certificate issued by the manufacturer of the equipment being installed.

510.5.3.1 Minimum qualifications of the designer. Effective two years from the date of fire code adoption, the minimum qualifications of the system designer shall include the following:

1. Certification by National Institute for Certification in Engineering Technologies (NICET) as a Design Technician in In-Building Public Safety Communications (IB-PSC).

510.5.4 Acceptance test procedure – SN/CC

510.5.4 Acceptance test procedure. Where an in-building emergency responder communications enhancement system is required, and upon completion of installation, the building *owner* shall have the radio system tested to verify that two-way coverage on each floor of the building is not less than 95 percent. The test procedure shall be conducted as follows and as detailed in the *Clark County Fire Department Guideline for Emergency Responder Communications Enhancement Systems Permitting, Testing, & Recertification*:

1. Each floor of the building shall be divided into a grid of 20 approximately equal test areas.
2. The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency's radio communications system or equipment *approved* by the *fire code official*.
3. Failure of more than one test area shall result in failure of the test.
4. In the event that two of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal test areas. Failure of not more than two nonadjacent test areas shall not result in failure of the test. If the system fails the 40-area test, the system shall be altered to meet the 95-percent coverage requirement.

5. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered to be a failure of that test area. Additional test locations shall not be permitted.
6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building owner so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building owner shall be required to rerun the acceptance test to reestablish the gain values.
7. As part of the installation, a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and at subsequent annual inspections.
8. Systems shall be tested using two portable radios simultaneously conducting subjective voice quality checks. One portable radio shall be positioned not greater than 10 feet (3048 mm) from the indoor antenna. The second portable radio shall be positioned at a distance that represents the farthest distance from any indoor antenna. With both portable radios simultaneously keyed up on different frequencies within the same band, subjective audio testing shall be conducted and comply with DAQ levels as specified in Sections 510.4.1.1 and 510.4.1.2.

510.6 Maintenance – CC

510.6 Maintenance. The in-building emergency responder communications enhancement system shall be maintained operational at all times in accordance with Sections 510.6.1 through 510.6.5.

510.6.1 Testing and proof of compliance – SN

510.6.1 Testing and proof of compliance. The *owner* of the building or *owner's* authorized agent shall have the in-building emergency responder communications enhancement system inspected and tested annually or where structural changes occur, including additions or remodels that could materially change the original field performance tests. Testing shall consist of the following:

1. In-building coverage test as described in Section 510.5.4.
2. Signal boosters shall be tested to verify that the gain is the same as it was upon initial installation and acceptance or set to optimize the performance of the system.
3. Backup batteries and power supplies shall be tested under load of a period of 1 hour to verify that they will properly operate during an actual power outage. If within the 1-hour test period the battery exhibits symptoms of failure, the test shall be extended for additional 1-hour periods until the integrity of the battery can be determined.
4. All active components shall be checked to verify operation within the manufacturer's specifications.

At the conclusion of the testing, a report, which shall verify compliance with Section 510.5.4, shall be submitted to the *fire code official* as described in Section 110.3.

510.6.5 Operational Maintenance – CC

510.6.5 Operational Maintenance

510.6.5.1 Maintenance contract. The *owner* is responsible for holding a maintenance contract with a company that can provide emergency response 24 hours a day, 7 days a week.

510.6.5.2 Maintenance records. Maintenance records shall be maintained on-site. Copies of all maintenance records shall be submitted to the agency's representatives and the *fire code official* when requested.

604.2 Emergency operation – SN

604.2 Emergency operation. Existing elevators with a travel distance of 25 feet (7620 mm) or more shall comply with the requirements of the *International Existing Building Code*. New elevators shall be provided with Phase I emergency recall operation and Phase II emergency in-car operation in accordance with ASME A17.1/CSA B44. No building security, access control or similar system shall disable or override any new or existing Phase II emergency operations, preventing access to all levels.

605.1.3 Fuel Oil – SN

605.1.3 Fuel Oil. The grade of fuel oil used in an oil burner shall be that for which the oil burner is *approved* and as stipulated by the oil burner manufacturer's instructions. Oil containing gasoline shall not be used. Waste crankcase oil shall be an acceptable fuel in Group F, M and S occupancies where utilized in equipment *listed* and *labeled* for use with waste oil and when such equipment is installed in accordance with the manufacturer's instructions and the terms of its listing. For the purposes of this section, the definition of fuel oil includes fuels such as diesel that are intended for use in reciprocating internal combustion engines.

605.4.2.3 Restricted use and connection – SN

605.4.2.3 Restricted use and connection. Tanks installed in accordance with Section 605.4.2 shall be used only to supply fuel oil to fuel-burning equipment, generators or fire pumps installed in accordance with Section 605.4.2.5. Connections between tanks and equipment supplied by such tanks shall be made using closed piping systems in accordance with the *Uniform Mechanical Code*. Fuel connections and tank relief vents shall be located on the exterior of the building in *approved* locations.

606.3.5 Access panel coordination – SN

606.3.5 Access panel coordination. Ducts shall be provided with access panels to facilitate servicing of automatic sprinklers installed within the duct. Access panel locations shall be coordinated with the location of automatic sprinklers and located a maximum of 18 inches (457 mm) away from the installed sprinkler location. Access panels shall be in accordance with the *Uniform Mechanical Code* requirements.

608.6 Access – SN

608.6 Access. Access to refrigeration systems having a refrigerant circuit containing more than the allowable quantity of refrigerant as stated in Table 1102.3 of the *Uniform Mechanical Code* shall be provided for the fire department at all times as required by the *fire code official*.

608.7 Testing of equipment – SN

608.7 Testing of equipment. Refrigeration equipment and systems having a refrigerant circuit containing more than the allowable quantity of refrigerant as stated in Table 1102.3 of the *Uniform Mechanical Code* shall be subject to periodic testing in accordance with Section 608.7.1. Records of tests shall be maintained. Tests of emergency devices or systems required by this chapter shall be conducted by persons trained and qualified in refrigeration systems.

608.8 Emergency signs – SN

608.8 Emergency signs. Refrigeration units or systems having a refrigerant circuit containing more than the allowable quantity of refrigerant as stated in Table 1102.3 of the *Uniform Mechanical Code* shall be provided with *approved* emergency signs, charts and labels in accordance with NFPA 704. Hazard signs shall be in accordance with the *Uniform Mechanical Code* for the classification of refrigerants listed therein.

608.10 Remote controls – SN

608.10 Remote controls. Where flammable refrigerants are used and compliance with Section 1107.0 of the *Uniform Mechanical Code* is required, remote control of the mechanical equipment and appliances located in the machinery room as required by Sections 608.10.1 and 608.10.2 shall be provided at an *approved* location immediately outside the machinery room and adjacent to its principal entrance.

608.12 Storage, use and handling – SN

608.12 Storage, use and handling. Flammable and combustible materials shall not be stored in machinery rooms for refrigeration systems having a refrigerant circuit containing more than the allowable quantity of refrigerant as stated in Table 1102.3 of the *Uniform Mechanical Code*. Storage, use or handling of extra refrigerant or refrigerant oils shall be as required by Chapters 50, 53, 55 and 57.

> **Exception:** This provision shall not apply to spare parts, tools and incidental materials necessary for the safe and proper operation and maintenance of the system

608.17 Electrical equipment – SN

[M] 608.17 Electrical equipment. Where refrigerant of Groups A2, A3, B2 and B3, as defined in the *Uniform Mechanical Code*, are used, refrigeration machinery rooms shall conform to the Class I, Division 2 hazardous location classification requirements of NFPA 70.

> **Exception:** Ammonia machinery rooms that are provided with ventilation in accordance with Section 1102.2 of the *Uniform Mechanical Code*.

803.10 Site-fabricated stretch systems – SN

[BF] 803.10 Site-fabricated stretch systems. Where used as newly installed interior wall or interior ceiling finish materials, *site-fabricated stretch systems* containing all three components described in the definition in Chapter 2 shall be tested in the manner intended for use, and shall comply with the requirements of Section 803.1.1 or with the requirements of Class A in accordance with Section 803.1.2. If the materials are tested in accordance with ASTM E84 or UL 723, specimen preparation and mounting shall be in accordance with ASTM E2573.

803.10.1 Ceilings. Where used as a dropped ceiling, the following shall apply:

1. In Types I and II construction, frames shall be of non-combustible materials.
2. Where automatic sprinkler protection in accordance with Section 903.3.1.1 or 903.3.1.2 is required beneath the panel, core materials shall be of non-combustible materials.

806.1.1 Restricted occupancies – SN

806.1.1 Restricted occupancies. Natural cut trees shall be prohibited within ambulatory care facilities and Group A, B, E, F, H, I-1, I-2, I-3, I-4, M, R-1, R-2, R-4 and S occupancies.

Exception: Trees shall be allowed within *dwelling* units in Group R-2 occupancies.

807.1 General – SN

807.1 General. The following requirements shall apply to all occupancies:

1. Furnishings or decorative materials of an explosive or highly flammable character shall not be used.
2. Fire-retardant coatings in existing buildings shall be maintained so as to retain the effectiveness of the treatment under service conditions encountered in actual use.
3. Furnishings, draperies, hanging fabrics or other objects shall not be placed to obstruct *exits*, access thereto, egress therefrom or visibility thereof, and shall not obstruct fire protection and fire alarm devices and equipment, and shall not restrict the proper operation of such devices.
4. The permissible amount of noncombustible decorative materials shall not be limited.

807.2 Combustible decorative materials – CC

807.2 Combustible decorative materials. In Groups A, B, E, I, M and R-1 and in dormitories in Group R-2, curtains, draperies, fabric hangings and other similar combustible decorative materials suspended from walls or ceilings shall comply with Section 807.3 and shall not exceed 10 percent of the specific wall or ceiling area to which such materials are attached.

Fixed or movable walls and partitions, paneling, wall pads and crash pads applied structurally or for decoration, acoustical correction, surface insulation or other purposes shall be considered to be interior finish, shall comply with Section 803 and shall not be considered *decorative materials* or furnishings.

Exceptions:

1. In auditoriums in Group A, the permissible amount of curtains, draperies, fabric hangings and similar combustible decorative material suspended from walls or ceilings shall not exceed 75 percent of the aggregate wall area where the building is equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1 , and where the material is installed in accordance with Section 803.15 of the *International Building Code*.
2. In Group R-2 dormitories, within *sleeping units* and *dwelling units*, the permissible amount of curtains, draperies, fabric hangings and similar decorative materials suspended from walls or ceilings shall not exceed 50 percent of the aggregate wall areas where the building is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.
3. In Group B and M occupancies, the amount of combustible fabric partitions suspended from the ceiling and not supported by the floor shall comply with Section 807.3 and shall not be limited.
4. The 10-percent limit shall not apply to curtains, draperies, fabric hangings and similar combustible decorative materials used as window coverings.
5. The 10% limit shall not apply to vertical curtains or drapes that exceed 10% of the wall area where a line of standard coverage quick response fire sprinklers supplied from the overhead sprinkler system are located along the curtains/drapes, with maximum spacing between sprinklers of 6 feet (1828 mm), with sprinklers located within 3 feet (914 mm) horizontally from the end(s) of the curtain/drape installation, and with sprinkler heads located a maximum of 18 inches (457 mm) away horizontally from the curtain/drape line. These sprinklers are to have the same design criteria as those sprinklers serving the adjacent area. Where sprinklers installed for this purpose are not obstructed from providing area coverage protection, the sprinklers shall be permitted to protect to the extent of the coverage permissible.

901.2.2 Plans – SN

901.2.2 Plans. Complete plans and specifications for *fire protection systems* shall be submitted to the *fire code official* for review and be *approved* prior to system installation. *Approved* plans shall be kept readily available on the job site.

The licensee (contractor's Master or Qualified Employee) information shall be on submittals as per Nevada Administrative Code, Nevada Revised Statutes, and the Nevada Blue Book.

A designer of fire sprinkler, fire alarm, and special hazard systems shall hold a minimum Level II certification in their respective discipline from the National Institute for Certification in Engineering Technologies (NICET) or an equivalent certification (e.g. plans and calculations prepared by a Nevada Registered Professional Engineer working in their area of expertise). Submittals shall include the designer's printed name, certificate number, and signature.

901.4.4 Fire areas – CC

901.4.4 Fire areas. Where buildings, or portions thereof, are divided into *fire areas* so as not to exceed the limits established for requiring a *fire protection system* in accordance with this chapter, such *fire areas* shall be separated by *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both, having a *fire-resistance rating* of not less than that determined in accordance with Section 707.3.10 of the *International Building Code*. *Fire area* separations for *automatic sprinkler systems* shall be in accordance with Section 903.2.

901.4.7 Pump and riser rooms – SN

901.4.7 Pump and riser rooms. Where provided, fire pump rooms and *automatic sprinkler system* riser rooms shall be designed with adequate space (see NFPA 20 for fire pump clearances and NFPA 70 for working space clearances) for all equipment necessary for the installation, as defined by the manufacturer, with sufficient working space around the stationary equipment. Clearances around equipment to elements of permanent construction, including other installed equipment and appliances, shall be sufficient to allow inspection, service, repair or replacement without removing such elements of permanent construction or disabling the function of a required *fire-resistance-rated* assembly. Fire pump and *automatic sprinkler system* riser rooms shall be provided with exterior access doors and unobstructed passageways large enough to allow removal of the largest piece of equipment with a minimum width of 36 inches (914 mm) and a minimum height of 80 inches (2032 mm).

Automatic sprinkler system riser rooms shall have a minimum area of 16 square feet (1.49 m^2), with a minimum dimension of 4 feet (1219 mm) for the first sprinkler riser plus an additional 9 square feet (0.84 m^2) for each additional riser contained, unless otherwise *approved* by the *fire code official*.

> **Exception:** For high-rise, terminal, and covered mall buildings, secondary fire risers may be contained in *automatic sprinkler system* riser rooms that are located in dedicated rooms as *approved* by the *fire code official* in areas without direct access from the exterior.

901.4.7.1 Access. Automatic sprinkler system risers, fire pumps and controllers shall be provided with *ready access*. Where located in a fire pump room or *automatic sprinkler system* riser room, the door shall be permitted to be locked provided that the key is available at all times.

901.4.7.2 Marking on access doors. Access doors for *automatic sprinkler system* riser rooms and fire pump rooms shall be labeled with an *approved* weatherproof sign. Signage shall state: "Fire Sprinkler Riser Room" and "Fire Pump Room" or "Fire Pump House". The lettering shall be in contrasting color to the background. Letters shall have a minimum height of 2 inches (51 mm) with a minimum stroke of $^3/_8$ inch (10 mm).

901.4.7.3 Environment. *Automatic sprinkler system* riser rooms and fire pump rooms shall be maintained at a temperature of not less than 40°F (4°C) and a maximum temperature of 100º F (37.8°C). Heating and cooling units shall be permanently installed.

Exceptions:

1. Where the *automatic sprinkler system* riser room or fire pump room does not contain a fire alarm/monitoring panel or spare sprinklers heads, or when these devices are rated for higher ambient temperatures, the room shall not be required to be conditioned for maximum temperature.
2. Heating and/or conditioning is not required if calculations are prepared and sealed by a Nevada *registered design professional*, on a case-by case address specific basis, proving that the temperature within the riser room does not fall below 40º F (4°C) or rise above 100º F (37.8°C). To maintain 40º F (4°C), the temperature analysis must use a starting temperature of 50º F (10°C) and use an outside temperature of 0º F (-17.8°C) for a period of 8 hours. To maintain 100º F (37.8°C), the temperature analysis must use a starting temperature of 90º F (32.2°C) and use an outside temperature of 120º F (48.9°C) for a period of 8 hours.
3. Where the fire sprinkler riser room or fire pump room contains equipment that has a higher manufacturer's temperature rating acceptable to the *fire code official*.

901.4.7.4 Lighting. Permanently installed artificial illumination shall be provided in the *automatic sprinkler system* riser rooms and fire pump rooms. Lighting shall be provided with emergency power. Emergency power shall be capable of maintaining lighting level for a minimum of 2 hours.

901.4.7.5 Protection. Fire pump rooms and *automatic sprinkler system* riser rooms shall be separated from the rest of the building by 1-hour *fire partitions*.

901.4.7.6 Automatic sprinkler system riser rooms. A dedicated *automatic sprinkler system* riser room shall be required for each fire sprinkler system riser.

Exceptions:

1. Where *approved* by the *fire code official*, where systems are controlled by wall-mounted Post Indicator Valves (PIV), and where exterior access is provided to the monitoring panel that is located in a conditioned room, an *automatic sprinkler system* riser room is not required.
2. When *approved*, where a single system serves the building and the system is controlled by a PIV, a riser room is not required.
3. In multi-story facilities, floor control risers are permitted to be located on each floor level in an *exit stairway* enclosure.
4. Systems designed in accordance with Section 903.3.1.3 (NFPA 13D) do not require an *automatic sprinkler system* riser room.
5. Systems designed in accordance with Section 903.3.1.2 (NFPA 13R) shall have an *automatic sprinkler system* riser room/closet that is large enough to facilitate access to all the necessary fire sprinkler and fire alarm valves and devices. This area shall be accessible from the outside with either a door or an access panel large enough to allow for testing and maintenance of the system. The area shall also comply with section 901.4.7.3.
6. Fire pump rooms complying with Section 901.4.7.
7. When *approved*, rooms containing auxiliary control valves.

901.4.7.6.1 Contents. The primary *automatic sprinkler system* riser room shall contain the fire riser into the building. The fire riser shall contain at a minimum, a flow switch, a check valve, and a control valve, main drain, & pressure gauges.

Exception: Where there is a single system in the building and an exterior Post Indicator Valve (PIV) is provided, then the control valve is not required in the automatic sprinkler system riser room.

901.6 Inspection, testing and maintenance – SN/CC

901.6 Inspection, testing and maintenance. *Fire protection* and *life safety systems* shall be maintained in an operative condition at all times, and shall be replaced or repaired where defective. Nonrequired *fire protection* and *life safety systems* and equipment shall be inspected, tested and maintained or removed in accordance with Section 901.8.

All *fire protection* and *life safety systems* shall be tested and inspected in accordance with nationally recognized standards and the State of Nevada Fire Marshals' regulations. The maintaining contractor shall also provide proof of a license to do business within the *fire code official's* area. A maintenance contract from an *approved* fire protection company is required.

Prior to service or testing of any equipment, the fire department dispatch center shall be notified of the location of the test and the approximate time that the equipment will be inoperable. Upon the completion of the test and inspection, the fire department dispatch center shall be notified that the system is operable.

Decommissioning non-required *fire protection* and *life safety systems* installed as a required system under a previously adopted code requires the approval of the *fire code official*. When required, a decommissioning report and/or plans prepared by an *approved* design professional shall be submitted to the *fire code official*.

901.7 Systems out of service – CC

901.7 Systems out of service. Where a required *fire protection system* is out of service, the fire department and the *fire code official* shall be notified immediately in accordance with Appendix Q and, where required by the *fire code official*, the building shall either be evacuated, provided with other mitigation as required by the *fire code official*, or an *approved* fire watch shall be provided for all occupants left unprotected by the shutdown until the *fire protection system* has been returned to service.

Where utilized, fire watches shall be provided with at least one *approved* means for notification of the fire department, shall meet the requirements set forth in Appendix Q, and their only duty shall be to perform constant patrols of the protected premises and keep watch for fires.

In all instances where systems are out of service, either due to a planned or an emergency impairment, fire systems maintenance contractors shall be notified to respond to the site. Fire systems maintenance contractors shall assess the impairment, determine the time needed to execute repairs, and notify the impairment coordinator, and fire department and the *fire code official* as required by Appendix Q, of the repair time needed.

901.8.3 Bypassing fire protection or life safety systems – CC

901.8.3 Bypassing fire protection or life safety systems. *Fire protection* or *life safety systems* shall not be bypassed during the times the building or structure is occupied.

> **Exception:** When *approved* by the *fire code official* through an alternative means and methods report in accordance with Section 104.2.3.

901.10 Recall of fire protection components – SN

901.10 Recall of fire protection components. Any *fire protection system* component regulated by this code that is the subject of a voluntary or mandatory recall under federal law shall be replaced with *approved*, *listed* components in compliance with the referenced standards of this code. A construction permit shall be obtained for the replacement of all recalled components.

903.1.1 Alternative protection – SN

903.1.1 Alternative protection. This section is deleted from the IFC.

903.2 Where required – SN/CC

903.2 Where required. *Approved automatic sprinkler systems* in new buildings and structures shall be provided throughout all buildings and structures, regardless of occupancy type and including buildings and structures in accordance with the *International Residential Code*, which meet one of the following requirements, and additionally in the locations described in Sections 903.2.1 through 903.2.12:

1. For buildings constructed in accordance with the *International Building Code*, *approved automatic sprinklers systems* are required where the *building area* is 5,000 square feet (464 m^2) or greater.
2. For buildings constructed in accordance with the *International Residential Code*, *approved automatic sprinkler systems* are required.
3. For any buildings, not otherwise requiring fire sprinklers, where the available fire flow does not meet the fire flow requirements of this code, *approved automatic sprinkler systems* shall be provided as required by the *fire code official*.
4. For any buildings, not otherwise requiring fire sprinklers, where they do not meet the fire access requirements in Section 503 *approved automatic sprinkler systems* shall be provided as required by the *fire code official*.
5. In all occupancies except Group R-3, Group U, and occupancies in accordance with the *International Residential Code*, a building that is more than two stories in height, including any height added by usable floor space, is required to be provided with an *automatic sprinkler system* throughout.

Exceptions:

1. Automatic sprinklers shall not be required in buildings or structures used exclusively for agricultural, livestock, or equestrian activities, with or without spectators, where structures may cover the use, including the spectator area, provided the use is not enclosed with any walls along any portion of the perimeter of the structures, except for rooms containing code-required building service components, and provided that the minimum clear height along the entire perimeter of the structure is 7 feet 6 inches (2286 mm).
2. Playground shade structures, fuel dispensing canopies, and carports open to a minimum clear height of 10 feet (3048 mm) on all sides around the entire perimeter, with non-combustible structural support and frame, with either non-combustible material, or fabric complying with NFPA 701 providing shade, located a minimum of 10 feet (3048 mm) from the nearest building, property line or shade structure, and less than 10,000 square feet (929 m^2) in projected area, do not require fire sprinklers.
3. For new construction expanding existing unsprinklered Group R-3 buildings or one- and two-family *dwellings* built in accordance with *the International Residential Code*, sprinklers are not required to be retrofitted into the building where the building is provided with fire flow in accordance with Appendix B and the newly added living space does not exceed 5,000 square feet (464 m^2) square feet.
4. Unless otherwise required per Section 903.2.10, *open parking garages*, in accordance with Section 406.5 of the *International Building Code* 48,000 (4460 m^2) square feet or less with no other occupancy above *the open parking garage* structure and with fire apparatus lanes immediately adjacent to two open sides of the garage equaling a minimum of 40% of the garage perimeter are not required to be protected with automatic sprinklers.

5. Buildings, structures, or service equipment and installations directly used in utility generation or distribution which are installed on properly recorded easements belonging to water, gas, power, telephone, or other utility companies that are preemptively regulated by the Nevada Public Service Committee, a State of Nevada charter, or other public franchise having fire areas not exceeding the fire area thresholds listed in the published, unamended, *International Building Code* or *International Fire Code* adopted by the jurisdiction. This exception does not apply to non-exempted buildings or structures containing occupiable spaces such as offices, meeting rooms, service counters, public restrooms, laboratories, warehouses or other normally occupied spaces.

If any *fire area* in a building or structure is provided with fire sprinklers, whether required or not, all *fire areas* in the building or structure shall be provided with fire sprinklers:

Exceptions:

1. Where a building is subdivided into separate buildings, each having a total *building area* of less than 5,000 square feet (464 m^2), by *fire walls* with no openings constructed in accordance with section 706 of the *International Building Code*.
2. Special hazard areas that required sprinklers for certain uses, such as medical gas rooms, may be fire sprinklered without requiring additional fire sprinklers throughout the building, when *approved* by the *fire code official*.
3. Existing buildings modified in accordance with the *International Existing Building Code* or Section 903.6.

903.2.3 Group E – SN

903.2.3 Group E. An *automatic sprinkler system* shall be provided for Group E occupancies where one of the following conditions exists:

1. Throughout all Group E fire areas greater than 5,000 square feet (464 m^2) in area.
2. The Group E *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

   Exception: In buildings where every classroom has not fewer than one exterior exit door at ground level, an *automatic sprinkler system* is not required in any area below the lowest *level of exit discharge* serving that area.
3. The Group E *fire area* has an *occupant load* of 300 or more.
4. Daycare facilities where there is occupancy from 12:00 AM – 6:00 AM and care for 7 or more children.

903.2.9 Group S-1 – SN/CC

903.2.9 Group S-1. An *automatic sprinkler system* shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

1. A Group S-1 *fire area* exceeds 12,000 square feet (1115 m^2).
2. A Group S-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group S-1 *fire areas* on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2).
4. A Group S-1 *fire area* used for the storage of commercial motor vehicles where the *fire area* exceeds 5,000 square feet (464 m^2).
5. A Group S-1 *fire area* used for the storage of lithium-ion or lithium metal powered vehicles where the *fire area* exceeds 500 square feet (46.4 m^2).

6. A Group S-1 *fire area* used for self-storage.

903.2.11.5 Commercial cooking operations – SN

903.2.11.5 Commercial cooking operations. An *automatic sprinkler system* shall be installed in a commercial kitchen exhaust hood and duct systems where an *automatic sprinkler system* is used to comply with Section 904, and for the entire length of duct when the duct length exceeds 75 feet (22 860 mm).

903.3.1.1.1 Exempt locations – SN

903.3.1.1.1 Exempt locations. Automatic sprinklers shall not be required in the following rooms or areas where such rooms or areas are protected with an *approved* automatic fire detection system in accordance with Section 907.2 that will respond to visible or invisible particles of combustion. Sprinklers shall not be omitted from a room merely because it is damp, of *fire-resistance-rated* construction or contains electrical equipment.

1. A room or space where sprinklers constitute a serious life or fire hazard because of the nature of the contents, where *approved* by the *fire code official*.
2. Fire service access elevator machine rooms and machinery spaces.
3. Machine rooms, machinery spaces, control rooms and control spaces associated with occupant evacuation elevators designed in accordance with Section 3008 of the *International Building Code*.

903.3.1.2 NFPA 13R sprinkler systems – SN

903.3.1.2 NFPA 13R sprinkler systems. *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Two stories or less above *grade plane*.
2. For other than Group R-2 occupancies, the floor level of the highest story is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access.

   For Group R-2 occupancies, the roof assembly is less than 45 feet (13 716 mm) above the lowest level of fire department vehicle access. The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the *exterior wall*, or the top of the highest parapet, whichever yields the greatest distance.
3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the *International Building Code* shall be measured from *grade plane*.

903.3.5.3 Cross connections and backflow, minimum types of protection – SN

903.3.5.3 Cross connections and backflow, minimum types of protection. Sprinkler systems defined as Class 4, Class 5, and Class 6 fire sprinkler systems by NAC 445A, shall require approval from the water purveyor prior to system installation.

903.3.9 Floor control valves – SN

903.3.9 Floor control valves. *Approved* supervised indicating control valves shall be provided at the point of connection to the riser on each floor in multi-story buildings.

903.3.10 Tenant isolation control valves – SN

903.3.10 Tenant isolation control valves. *Approved* supervised indicating control valves shall be provided for Group A and Group M tenant spaces having public access exclusively to an adjacent assembly space or mall. Immediately adjacent tenant spaces may be combined up to a gross area of 5,200 square feet (483 m^2). This isolation control valve shall not define a separate sprinkler system. It shall be required in new construction and in existing buildings with a change of occupancy or construction affecting 20 or more sprinklers.

903.4 Sprinkler system supervision and alarms – SN

903.4 Sprinkler system supervision and alarms. *Automatic sprinkler system* supervision and alarms shall comply with Sections 903.4.1 through 903.4.3. Unless otherwise *approved*, systems meeting the requirements of this section shall not be used for any other purpose.

903.4.1 Electronic supervision – SN

903.4.1 Electronic supervision. Valves controlling the water supply for *automatic sprinkler systems*, pumps, tanks, water levels and temperatures, critical air pressures and waterflow switches on all *automatic sprinkler systems* shall be electrically supervised in accordance with NFPA 72 by a *listed* fire alarm control unit.

Exceptions:

1. *Automatic sprinkler systems* protecting one- and two-family *dwellings*.
2. Limited area sprinkler systems in accordance with Section 903.3.8, provided that the backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position unless supplying an occupancy required to be equipped with a *fire alarm system*, in which case the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.
3. *Automatic sprinkler systems* installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the *automatic sprinkler system*, and a separate shutoff valve for the *automatic sprinkler system* is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and *deluge sprinkler systems* that are sealed or locked in the open position.
8. Underground key or hub gate valves in roadway boxes.
9. Backflow prevention devices located at the municipal water supply connection are not required to be electrically supervised when either locked in the open position, located within an underground vault, or located within an *approved* insulated enclosure.

903.4.2 Monitoring – SN

903.4.2 Monitoring. Systems providing electronic supervision required by Section 903.4.1 shall be monitored by an *approved* supervising station in accordance with NFPA 72 and as *approved* by the *fire code official*.

Exception: Monitoring by a supervising station is not permitted unless specifically *approved* by the *fire code official* for:

1. *Automatic sprinkler systems* protecting one- and two-family *dwellings*.
2. Monitoring systems utilizing point-by-point monitoring.

In occupancies provided with a supervised sprinkler system, the following three distinctly different signals shall be transmitted to an *approved* supervising station:

1. Waterflow Alarm
2. Supervisory
3. System Trouble

For new and existing facilities, the supervising station shall only retransmit Waterflow Alarm signals to the fire department.

903.4.2.1 Transmission of signals. Transmission of signals to a supervising station shall be in accordance with NFPA 72.

903.4.2.2 MIY monitoring. Direct transmission of signals associated with monitor it yourself (MIY) transmitters to a public safety answering point (PSAP) shall not be permitted unless *approved* by the *fire code official*.

903.4.2.3 Termination of monitoring service. Prior to termination of monitoring service, notice shall be provided in accordance with Section 110.3.

903.4.3 Alarms – SN

903.4.3 Alarms. *Approved* audible and visual sprinkler waterflow alarm devices shall be connected to each *automatic sprinkler system*. Exterior sprinkler waterflow alarm devices shall be provided on the exterior of the building above the wall-mounted fire department connection. One interior sprinkler waterflow alarm device shall be provided near the main entrance or in a normally occupied location. In multiple-tenant facilities, one interior sprinkler waterflow alarm device shall be provided near the main entrance or in a normally occupied location for each tenant space. Such sprinkler waterflow alarm devices shall be activated by waterflow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where exterior sprinkler waterflow alarm devices are provided above wall-mounted fire department connections, the exterior device shall activate only upon waterflow from systems hydraulically connected to the associated fire department connection. Where a *fire alarm system* is provided, exterior sprinkler waterflow alarm devices shall be powered by a fire alarm control unit and actuation of the *automatic sprinkler system* shall actuate the building *fire alarm system*.

Exception: *Automatic sprinkler systems* protecting one- and two-family *dwellings*.

903.6 Where required in existing buildings and structures – SN

903.6 Where required in existing buildings and structures. An *automatic sprinkler system* shall be provided in existing buildings and structures at the locations described in Sections 903.6.1 through 903.6.3.2.

Where these provisions result in partially sprinklered buildings, durable weatherproof signage shall be provided at the fire department connection(s) clearly indicating that the building is partially protected with fire sprinklers and clearly identifying the portion(s) of the building covered by the fire sprinkler systems.

Where required by the *fire code official*, the underground fire service and fire sprinkler lead-in to the first portion of an existing unsprinklered building shall be sized to a minimum ordinary hazard group II sprinkler design for future expansion of the fire sprinkler system to cover all other portions of the building.

903.6.1 Additions. Additions to any building shall comply with this Section and the *International Existing Building Code*.

903.6.1.1 Addition with sprinklers. In existing unsprinklered buildings where sprinklers are provided for a building addition, whether required or not, the entire building shall be sprinklered.

Exceptions:

1. In other than Group H occupancies, sprinklers are not required to be provided beyond the *fire area* of the addition where the addition *fire area* is separated from the remainder of the building by a *fire barrier* constructed in accordance with Section 707 of the *International Building Code*, and without openings.
2. When *approved* by the *fire code official*, special hazard areas that are required to be sprinklered for specific uses, such as medical gas rooms, do not require the remainder of the building to be sprinklered.

903.6.1.2 Addition without sprinklers. In existing unsprinklered buildings where sprinklers are not otherwise required or provided in the building addition, the remainder of the building is not required to be provided with sprinklers where any of the following conditions are met:

1. The building has a total area of less than 5,000 square feet (464 m^2) (existing building area plus the addition) and the addition does not cause the existing building to trigger fire sprinkler protection due to occupancy-specific requirements contained in Section 903.
2. In other than Group H occupancies, the *fire area* containing the addition is separated from adjacent *fire areas* by a *fire barrier* constructed in accordance with Section 707 of the *International Building Code*, and without openings.
3. For new construction expanding existing unsprinklered Group R-3 buildings or one- and two-family *dwellings* built in accordance with the *International Residential Code*, sprinklers are not required to be retrofitted into the building where the building is provided with fire flow in accordance with Appendix B and the newly added living space does not exceed 5,000 square feet (464 m^2).

903.6.2 Alterations. Alterations within existing buildings shall comply with this Section and the *International Existing Building Code*.

903.6.2.1 Alterations with sprinklers added. In existing unsprinklered buildings where sprinklers are provided for an alteration, whether required or not, the entire building shall be sprinklered.

Exceptions:

1. In other than Group H occupancies, sprinklers are not required to be provided beyond the *fire area* containing the alteration where it is separated from the remainder of the building by a *fire barrier* constructed in accordance with Section 707 of the *International Building Code*, and without openings.
2. When *approved* by the *fire code official*, special hazard areas that are required to be sprinklered for specific uses, such as medical gas rooms, do not require the remainder of the building to be sprinklered.

903.6.2.2 Alterations without sprinklers. In existing unsprinklered buildings where sprinklers are not otherwise required or provided in the alteration, the remainder of the building is not required to be provided with sprinklers due to the alteration.

903.6.3 Change of Occupancy. A change of occupancy within an existing building shall comply with this Section and the *International Existing Building Code*.

903.6.3.1 Change of Occupancy with sprinklers added. In existing unsprinklered buildings where sprinklers are provided for an area containing a change of occupancy, whether required or not, the entire building shall be sprinklered.

Exceptions:

1. In other than Group H occupancies, sprinklers are not required to be provided beyond the *fire area* containing the change of occupancy where it is separated from the remainder of the building by a *fire barrier* constructed in accordance with Section 707 of the *International Building Code*, and without openings.
2. The building has a total area of less than 5,000 square feet (464 m^2) and the change of occupancy does not cause the existing building to trigger fire sprinkler protection due to occupancy-specific requirements contained in Section 903.
3. When *approved* by the *building official* and *fire code official*, a change in occupancy to an equal or lesser hazard shall not require the installation of sprinklers for any part of the building. To make such a determination, the *building official* and *fire code official* may consider changes in occupant load, relative fire hazard and other relevant data.
4. When *approved* by the *fire code official*, special hazard areas that are required to be sprinklered for specific uses, such as medical gas rooms, do not require the remainder of the building to be sprinklered.

903.6.3.2 Change of Occupancy without sprinklers. In existing buildings without sprinklers, sprinklers are not required to be provided where the change of occupancy meets the provisions of the *International Existing Building Code* and the provisions of Section 903 of the *International Building Code*. If sprinklers are not required, the remainder of the building is not required to be provided with sprinklers where in accordance with Section 903.6.3.1.

904.2 Where permitted – SN

904.2 Where permitted. *Automatic fire-extinguishing systems* shall be *approved* by the *fire code official*.

904.14.5.2 Extinguishing system service – SN

904.14.5.2 Extinguishing system service. *Automatic fire-extinguishing systems* shall be serviced not less frequently than every six months and after activation of the system. Inspection shall be conducted by personnel licensed by the State of Nevada Fire Marshal's Office, and a certificate of inspection shall be maintained in accordance with Section 110.3.JUSTIFICATION: The purpose of this amendment is to correlate with the requirements of the State Fire Marshal for licensure.

905.3 Required installations – SN

905.3 Required installations. Standpipe systems shall be installed where required by Sections 905.3.1 through 905.3.8. Standpipe systems are allowed to be combined with *automatic sprinkler systems*.

Exceptions:

1. Standpipe systems are not required in Group R-2 *townhouses*.
2. Standpipe systems are not required in Group R-3 occupancies.

The standpipe design shall be *approved* by the *fire code official*. Standpipes in buildings with fire pumps shall be automatic. Standpipes in buildings not subject to freezing shall be wet. Standpipes in areas subject to freezing shall be permitted to be manual dry when equipped with both Knox locking caps and/or Knox plugs for fire department connections and hose valves that are acceptable to the *fire chief*.

905.3.1 Height – SN

905.3.1 Height. *Approved* Class I standpipe systems shall be installed throughout buildings where any of the following conditions exist:

1. Four or more stories are above or below *grade plane*.
2. The floor level of the highest story is located more than 30 feet (9144 mm) above the lowest level of the fire department vehicle access.
3. The floor level of the lowest story is located more than 30 feet (9144 mm) below the highest level of the fire department vehicle access.

Exception: In determining the lowest level of fire department vehicle access, it shall not be required to consider:

1. Recessed loading docks for four vehicles or less.
2. Conditions where topography makes access from the fire department vehicle to the building impractical or impossible.

905.3.3 Covered and open mall buildings – SN

905.3.3 Covered and open mall buildings. Covered mall and open mall buildings shall be equipped throughout with a standpipe system where required by Section 905.3.1. Mall buildings not required to be equipped with a standpipe system by Section 905.3.1 shall be equipped with Class I hose connections connected to the *automatic sprinkler system* sized to deliver water at 250 gallons per minute (946.4 L/min) at the hydraulically most remote hose connection while concurrently supplying the *automatic sprinkler system* demand. The standpipe system shall be designed not to exceed a 50 pounds per square inch (psi) (345 kPa) residual pressure loss with a flow of 250 gallons per minute (946.4 L/min) from the fire department connection to the hydraulically most remote hose connection. Hose connections shall be provided at each of the following locations:

1. Within the mall at the entrance to each *exit passageway* or *corridor*.
2. At each floor-level landing within *interior exit stairways* opening directly on the mall.
3. At exterior public entrances to the mall of a covered mall building.
4. At public entrances at the perimeter line of an open mall building.
5. At other locations as necessary so that the distance to reach all portions of a tenant space does not exceed 100 feet (30 480 mm) of hose and 30-foot (9144 mm) of stream from a hose connection. The length of hose shall be measured along normal walking routes, and the stream shall not be expected to penetrate walls or windows.

905.3.8 Building area – SN

905.3.8 Building area. When required by the *fire code official*, buildings in excess of 10,000 square feet (929 m²) in area per level shall be equipped with a Class I standpipe system where any portion of the building's interior area is more than 200 feet (60,960 mm) measured vertically and horizontally from the nearest point of fire department apparatus access.

905.4 Location of Class I standpipe hose connections – SN

905.4 Location of Class I standpipe hose connections. Class I standpipe hose connection shall be provided in all of the following locations:

1. In every required *interior exit stairway* or *exterior exit stairway*, a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing unless otherwise *approved* by *the fire code official*.

   Exception: A single hose connection shall be permitted to be installed in the open *corridor* or open breezeway between open *stairs* that are not greater than 75 feet (22 860 mm) apart.

2. On each side of the wall adjacent to the exit opening of a horizontal exit.

   Exception: Where floor areas adjacent to a horizontal exit are reachable from an interior exit stairway or exterior exit stairway hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal exit.

3. In every *exit passageway*, at the entrance from the *exit passageway* to other areas of a building.

   Exception: Where floor areas adjacent to an *exit passageway* are reachable from an *interior exit stairway* or *exterior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit passageway* to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an *exit passageway* or *exit corridor* to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an *exit passageway* or *exit corridor* to the mall.

5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an *interior exit stairway* with access to the roof provided in accordance with Section 1011.12.

6. Throughout the entire building so that all portions of each floor level are provided with hose valve coverage utilizing 100 feet (30 480 mm) of hose and 30-foot (9144 mm) stream from any hose connection located on that floor or intermediate landing. The length of hose shall be measured along normal walking routes, and the stream shall not be expected to penetrate walls or windows.

905.4.1 Protection – SN

905.4.1 Protection. Risers and laterals of Class I standpipe systems not located within an *interior exit stairway* or pressurized enclosure shall be protected by a degree of *fire resistance* equal to that required for vertical enclosures in the building in which they are located.

Exception: In buildings constructed of Type I or Type II construction in accordance with the *International Building Code* or in buildings equipped throughout with an *approved automatic sprinkler system*, standpipe laterals and vertical risers that are not located within an *interior exit stairway* are not required to be enclosed within fire-resistance-rated construction.

905.9 Valve Supervision – SN/CC

905.9 Valve Supervision. Valves controlling water supplies shall be electrically supervised in the open position in accordance with Sections 903.4.1 & 903.4.2. Where a *fire alarm system* is provided, a signal shall be transmitted to the control unit.

Exceptions:

1. Valves to underground key or hub valves in roadway boxes do not require supervision.

2. Valves locked in the normal position and inspected as provided in this code in buildings not equipped with a *fire alarm system* or sprinkler monitoring system in accordance with Section 903.4.

906.2 General requirements – SN

906.2 General requirements. Portable fire extinguishers shall be selected, installed and maintained in accordance with this section and NFPA 10.

Exceptions:

1. The distance of travel to reach an extinguisher shall not apply to the spectator seating portions of Group A-5 occupancies.
2. Thirty-day inspections shall not be required and maintenance shall be performed annually for dry-chemical or halogenated agent portable fire extinguishers that are supervised by a *listed* and *approved* electronic monitoring device, provided that all of the following conditions are met:
    - 2.1. Electronic monitoring shall confirm that extinguishers are properly positioned, properly charged and unobstructed.
    - 2.2. Loss of power or circuit continuity to the electronic monitoring device shall initiate a trouble signal.
    - 2.3. The extinguishers shall be installed inside of a building or cabinet in a noncorrosive environment.
    - 2.4. Electronic monitoring devices and supervisory circuits shall be tested every 3 years when extinguisher maintenance is performed.
    - 2.5. A written log of required hydrostatic test dates for extinguishers shall be maintained by the *owner* to verify that hydrostatic tests are conducted at the frequency required by NFPA 10.
3. In Group I-3, portable fire extinguishers shall be permitted to be located at staff locations.

907.1 General – SN

907.1 General. This section covers the application, installation, performance and maintenance of fire alarm systems and their components in new and existing buildings and structures. The requirements of Section 907.2 are applicable to new buildings and structures. The requirements of Section 907.9 are applicable to existing buildings and structures.

A separate fire alarm control unit is required for each separate building. A campus system shall not substitute the requirement for a separate fire alarm control unit for each separate building. Campus systems may be allowed subject to the approval of the *fire code official*. When *approved* by the *fire code official* campus systems circuits shall utilize Class X circuits with weatherproof raceways.

907.1.4 Signage – SN

907.1.4 Signage. A “FIRE ALARM CONTROL PANEL”, “FACP”, or “FIRE ALARM CONTROL UNIT”, “FACU” sign shall be provided in minimum 2-inch (51 mm) letters with a minimum ½ inch (13 mm) stroke. The color of the letters shall be contrasting with respect to the background. The sign shall be provided on the door leading to the fire alarm control panel(s), unless otherwise *approved* by the *fire code official*.

907.2 Where required-new buildings and structures – SN

907.2 Where required-new buildings and structures. An *approved fire alarm system* installed in accordance with the provisions of this code and NFPA 72 shall be provided in new buildings and structures in accordance with Sections 907.2.1 through 907.2.24 and provide occupant notification in accordance with Section 907.5, unless other requirements are provided by another section of this code. In separated mixed-use occupancy buildings, the fire alarm/detection system shall be limited to the *fire area* that requires the system. In non-separated mixed-use occupancy buildings containing an occupancy with a fire alarm/detection system the system is required to be extended throughout the building or *fire area*.

A *fire alarm system* shall be installed throughout all buildings three or more stories in height.

Exception: Group R-3 occupancies and single-family *dwellings* built under the *International Residential Code*.

Not fewer than one manual fire alarm box shall be provided in an *approved* location to initiate a fire alarm signal for fire alarm systems employing automatic fire detectors or waterflow detection devices. Where other sections of this code allow elimination of fire alarm boxes due to sprinklers, a single fire alarm box shall be installed.

Exception:

1. The manual fire alarm box shall not be installed for fire alarm systems dedicated to elevator recall control and supervisory service, and fire sprinkler monitoring systems.

907.2.7.1.1 Occupant notification – SN

907.2.7.1.1 Occupant notification. This section is deleted from the IFC.JUSTIFICATION: This section doesn't consider the notification of hearing-impaired people that may be in mercantile occupancies. Such a delay in notification is unjustifiable, subject to human error, staffing considerations, staff training and maintenance of instructions near the method of signal initiation.

907.2.8.2 Automatic smoke detection system – SN

907.2.8.2 Automatic smoke detection system. An *automatic smoke detection system* that activates the occupant notification system in accordance with Section 907.5 shall be installed throughout all interior *corridors* serving *sleeping units*. For the purposes of this section, interior means a conditioned space.

Exception: An *automatic smoke detection system* is not required in buildings that do not have interior *corridors* serving *sleeping units* and where each *sleeping unit* has a *means of egress* door opening directly to an *exit* or to an exterior *exit access* that leads directly to an *exit*.

907.2.9.1 Manual fire alarm system – SN

907.2.9.1 Manual fire alarm system. A manual *fire alarm system* that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-2 occupancies where any of the following conditions apply:

1. Any *dwelling unit* or *sleeping unit* is located three or more stories above the lowest *level of exit discharge*.
2. Any *dwelling unit* or *sleeping unit* is located more than one story below the highest *level of exit discharge* of *exits* serving the *dwelling unit* or *sleeping unit*.
3. The building contains 15 or more *dwelling units* or *sleeping units*.

Exceptions:

1. A *fire alarm system* is not required in buildings not more than two stories in height where all *dwelling units* or *sleeping units* and contiguous attic and crawl spaces are separated from each other and public or common areas by not less than 1-hour *fire partitions* and each *dwelling unit* or *sleeping unit* has an *exit* directly to a *public way*, *exit court* or yard.
2. Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2 and the occupant notification appliances will automatically activate throughout the notification zones upon a sprinkler water flow.
    2.1. At least one manual fire alarm box is installed at an *approved* location.
3. A *fire alarm system* is not required in buildings that do not have interior *corridors* serving *dwelling units* and are protected by an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, provided that *dwelling units* either have a *means of egress* door opening directly to an exterior *exit access* that leads directly to the *exits* or are served by open-ended *corridors* designed in accordance with Section 1027.6, Exception 3.
    3.1. This exception shall not apply to buildings 3 or more stories in height

907.2.9.1.1 Automatic smoke detection system – SN

907.2.9.1.1 Automatic smoke detection system. When a *fire alarm system* is required, an *automatic smoke detection system* that activates the occupant notification system in accordance with Section 907.5 shall be installed throughout all interior *corridors* serving *dwelling units*. For the purposes of this section, interior means a conditioned space.

Exception: An *automatic smoke detection system* is not required in buildings that do not have interior *corridors* serving *dwelling units* and where each *dwelling unit* has a *means of egress* door opening directly to an *exit* or to an exterior *exit access* that leads directly to an *exit*.

907.2.10.1 Public- and self-storage occupancies – SN

907.2.10.1 Public- and self-storage occupancies. A manual *fire alarm system* that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group S public- and self-storage occupancies three stories or greater in height.**Exception:** Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

907.2.13 High-rise buildings – SN

907.2.13 High-rise buildings. High-rise buildings shall be provided with an *automatic smoke detection system* in accordance with Section 907.2.13.1, a fire department communication system in accordance with Section 907.2.13.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.

Exceptions:

1. Airport traffic control towers in accordance with Section 907.2.22 of this code and Section 412 of the *International Building Code*.
2. Open parking garages in accordance with Section 406.5 of the *International Building Code*.
3. Unenclosed portions of buildings with an occupancy in Group A-5 in accordance with Section 303.1 of the *International Building Code*.

4. Low-hazard special occupancies in accordance with Section 503.1.1 of the *International Building Code*.

907.2.13.1.3 System smoke detection with sounder bases – SN

907.2.13.1.3 System smoke detection with sounder bases. In a new structure classified as a *high-rise building* with residential occupancies, in lieu of installing stand-alone smoke alarms, system-type analog addressable smoke detectors with sounder-bases shall be installed in all locations required by Section 907.2.11. Activation of said devices shall send a supervisory alarm signal to the building fire alarm control panel. The smoke detector sounder shall only sound within the individual *dwelling unit*, suite of rooms, or similar area and shall not actuate the building *fire alarm system*, unless otherwise permitted by the *fire code official*.

907.2.13.2 Fire department communication system – SN

907.2.13.2 Fire department communication system. Where a wired communication system is provided in addition to an in-building, two-way emergency responder communication coverage system in accordance with Section 510, the wired fire department communication system shall be designed and installed in accordance with NFPA 72 using warden stations and shall operate between a *fire command center* complying with Section 508, elevators, elevator lobbies, emergency and standby power rooms, fire pump rooms, areas of refuge and inside *interior exit stairways* and other locations as required by the *fire code official*. The fire department communication device shall be provided at each floor level within the *interior exit stairway*.

907.2.13.3 Multiple-channel voice evacuation – SN

907.2.13.3 Multiple-channel voice evacuation. Voice evacuation systems for high-rise buildings shall be multiple-channel systems.

907.2.13.4 Reliability – SN

907.2.13.4 Reliability. If a networked *fire alarm system* is installed, and if the fire alarm network nodes are interconnected utilizing physical conductors (e.g., metallic, optical fiber), the network nodes shall be interfaced with each other utilizing Class X wiring methods. The outgoing and return conductors shall not be run in the same cable assembly, enclosure, or raceway.

907.2.16 Aerosol storage uses – SN

907.2.16 Aerosol storage uses. This section is deleted from the IFC.

907.2.24 Child-care smoke detectors – SN

907.2.24 Child-care smoke detectors. System smoke detectors shall be installed within sleeping areas of child-care facilities.

Exception: Single-station smoke alarms may be permitted in facilities not otherwise required to be provided with a *fire alarm system*.

907.3.1 Duct smoke detectors – SN

907.3.1 Duct smoke detectors. Smoke detectors installed in ducts shall be *listed* for the air velocity, temperature and humidity present in the duct. Duct smoke detectors shall be connected to the building's fire alarm control unit where a *fire alarm system* is provided. Activation of a duct smoke detector shall initiate a visible and audible supervisory signal on the building's fire alarm control unit when a fire alarm system is provided and shall perform the intended fire safety function in accordance with this code and the *Unform Mechanical Code*. In facilities that are required to be monitored by a supervising station, duct smoke detectors shall report only as a supervisory signal and not as a fire alarm. They shall not be used as a substitute for required open area detection.

907.4.1 Protection of fire alarm control unit – SN

907.4.1 Protection of fire alarm control unit. In areas that are not continuously occupied, a single smoke detector shall be provided at the location of each fire alarm control unit, notification appliance circuit power extenders and supervising station transmitting equipment.

Exceptions:

1. Where ambient conditions prohibit installation of a smoke detector, a heat detector shall be permitted.
2. Dedicated function sprinkler monitoring systems shall not be required to have a smoke detector installed above the dedicated function control unit.

907.4.2 Manual fire alarm boxes – SN

907.4.2 Manual fire alarm boxes. Where a manual *fire alarm system* is required by another section of this code, it shall be activated by dual action fire alarm boxes installed in accordance with section 907.4.2.1 through 907.4.2.6.

907.5.2.1.1 Average sound pressure – SN

907.5.2.1.1 Average sound pressure. The audible alarm notification appliances shall provide a sound pressure level of 15 decibels (dBA) above the average ambient sound level or 5 dBA above the maximum sound level having a duration of not less than 60 seconds, whichever is greater, in every occupiable space within the building. The minimum sound pressure levels shall be: 90 dBA in mechanical equipment rooms; and 80 dBA in other occupancies. Audible notification appliances shall be installed in each occupiable space.

Exceptions:

1. Laundry rooms, walk-in closets, storage rooms and walk-in coolers/freezers equal to or less than 100 square feet (9.29 m^2) in floor area. Sound pressure levels shall be measured during system acceptance testing to verify the space achieves a minimum of 80 dBA.
2. In lieu of showing an audible notification appliance within a specific occupiable space on the plans, calculations may be provided showing that the alarm signals from the adjacent audible appliances will achieve a minimum of 80 dBA inside and throughout that space, where doors or other barriers between the space and the adjacent audibility device(s) are closed. Sound pressure levels shall be measured during system acceptance testing to verify the calculated space achieves a minimum of 80 dBA.
3. In sleeping areas required to be protected with low-frequency alarms, the 80 dBA minimum sound pressure provision is not required where a *listed* fire alarm device is not available to simultaneously achieve both the low-frequency signal and the 80 dBA minimum sound pressure.

907.5.2.3.1 Public use areas and common use areas – SN

907.5.2.3.1 Public use areas and common use areas. Visible alarm notification appliances shall be provided in public use areas and common use areas.

Exceptions:

1. Storage rooms, electrical rooms and mechanical rooms that are not normally occupied and are less than 400 square feet (37.2 m^2).
2. Janitor closets.
3. Exit enclosures.
4. Individual work areas or offices and private toilets serving individual work areas or offices provided that the notification appliance circuits serving such areas are initially designed with not less than 20-percent spare capacity to account for the potential of adding visible notification appliances in the future to accommodate hearing-impaired employee(s).
5. Individual inmate sleeping areas and patient sleeping rooms.

907.5.2.3.2 Groups I-1 and R-1 – SN

907.5.2.3.2 Groups I-1 and R-1. *Dwelling units* and *sleeping units* in Group I-1 and R-1 occupancies in accordance with Table 907.5.2.3.2 shall be provided with visible alarm notification throughout the unit except in closets that are not walk-in closets. Visible alarms shall be activated by the in-room smoke alarm and the building *fire alarm system*.

907.5.2.3.3.1 Wired equipment – SN

907.5.2.3.3.1 Wired equipment. Where wired equipment is used to comply with the future capability required by Section 907.5.2.3.3, one of the following shall be provided:

1. All notification and auxiliary circuits serving *dwelling* or *sleeping units* shall be provided with a return loop to the power supply serving those units utilizing the same size conductors.
2. Proof calculations for load and voltage drop shall be provided to the *fire code official* for all power supplies and notification/auxiliary circuits serving *dwelling* or *sleeping units*. Proof calculations shall demonstrate sufficient spare capacity for conversion of the most demanding unit on each circuit to include visible notification.

907.6.4.1 Alarm annunciator and fire alarm control unit – SN

907.6.4.1 Alarm annunciator and fire alarm control unit. Alarm annunciators and fire alarm control units shall comply with all of the following:

1. If a building has a main entrance/foyer and has more than one story, a read-only remote annunciator shall be provided inside the building at the main entrance/foyer.

   Exceptions:

   1. High-rise buildings provided with a *fire command center*.
   2. Alternate location as *approved* by the *fire code official*.

2. If a building has a fire riser room with an exterior door, the fire alarm control unit shall be provided within the fire riser room.

   Exceptions:

   1. High-rise buildings provided with a *fire command center*.

2. Alternate location as *approved* by the *fire code official*.

3. The location of an operated initiating device shall be displayed by alphanumeric display at the annunciator.
4. The alphanumeric display shall state the device type, the floor level (if applicable), the device address and a descriptive location for the operated device(s).
5. The visible annunciation of the location of operated initiating devices shall not be canceled by the means used to deactivate alarm notification appliances.

907.6.6 Monitoring – SN

907.6.6 Monitoring. Fire alarm systems required by this chapter or by *the International Building Code* shall be monitored by an *approved* supervising station in accordance with NFPA 72 and as *approved* by the *fire code official*. Home care facilities that are licensed by the State of Nevada are also required to be monitored per this section. Proprietary Supervising Station Systems (also called self-monitoring systems), when allowed by the *fire code official*, shall be in accordance with the *International Fire Code* and NFPA 72.

Exception: Monitoring by a supervising station is not permitted unless specifically *approved* by the *fire code official* for:

1. Single- and multiple station smoke alarms required by Section 907.2.11.
2. *Automatic sprinkler systems* in one- and two-family *dwellings*.
3. Monitoring systems utilizing point-by-point monitoring.

In occupancies provided with a *fire alarm system*, the following five distinctly different alarm signals shall be transmitted to an *approved* supervising station:

1. Water Flow Alarm, if provided with a fire sprinkler system.
2. Fire Alarm.
3. System Trouble.
4. Supervisory, when applicable.
5. Carbon Monoxide Alarm, when applicable.

For new and existing facilities, the supervising station shall only retransmit Water Flow Alarm signals to the fire department.

Exception: The supervising station shall also retransmit carbon monoxide and fire alarm signals for government buildings, (all facilities owned, leased and/or operated by any City, County, State, or Federal government agency) schools (including daycares, preschools, public and private schools etc.) and hospitals (including nursing homes, convalescent homes, adult care facilities, group homes, extended care facilities, etc.).

907.6.7 Connections to other systems – SN

907.6.7 Connections to other systems. A *fire alarm system* shall not be used for any purpose other than fire warning unless *approved* by the *fire code official*. Interconnections to other systems shall be *listed* for compatibility or *approved* by *the fire code official*.

907.6.8 Control units – SN

907.6.8 Control units. Unless otherwise *approved*, not more than one main or master fire alarm control unit shall be permitted per building, in an *approved* location. Unless otherwise *approved*, not more than one monitoring panel shall be permitted per building.

907.9 Where required in existing buildings and structures – SN

907.9 Where required in existing buildings and structures. An *approved fire alarm system* shall be provided in existing buildings and structures where required in this section.

907.9.1 Additions. Additions to any building shall comply with this section and the *International Existing Building Code*. In existing buildings where fire alarms are provided for the addition, whether required or not, coverage shall be extended to include the entire building.

> **Exception:** In other than Group H occupancies, fire alarm system coverage is not required beyond the *fire area* containing the addition where the addition *fire area* is separated from the remainder of the building by a *fire barrier* constructed in accordance with Section 707 of the *International Building Code*, with openings protected with automatic-closing devices.

907.9.2 Alterations. Existing buildings that undergo an alteration shall comply with this section and the *International Existing Building Code*.

> **Exception:** Alterations consisting solely of the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose.

In existing buildings where fire alarms are provided for an alteration, whether required or not, coverage shall be extended to include the entire building.

> **Exception:** In other than Group H occupancies, fire alarm system coverage is not required beyond the *fire area* containing the alteration where the alteration *fire area* is separated from the reminder of the building by a *fire barrier* constructed in accordance with Section 707 of the *International Building Code*, and with openings protected with automatic-closing devices.

907.9.3 Change of Occupancy. Existing buildings that undergo a change of occupancy shall comply with this section and the *International Existing Building Code*.

> **Exception:** When *approved* by the *building official* and *fire code official*, a change in occupancy to an equal or lesser hazard shall not require the installation of a *fire alarm system* for any part of the building. To make such a determination, the *building official* and *fire code official* may consider changes in occupant load, relative fire hazard and other relevant data.

In existing buildings where fire alarms are provided for a change of occupancy, whether required or not, coverage shall be extended to include the entire building.

> **Exception:** In other than Group H occupancies, fire alarm system coverage is not required beyond the *fire area* containing the change of occupancy where the change of occupancy *fire area* is separated from the reminder of the building by a *fire barrie*r constructed in accordance with Section 707 of the *International Building Code*, with openings protected with automatic-closing devices.

909.2 General design requirements – SN/CC

909.2 General design requirements. Buildings, structures, or parts thereof required by the *International Building Code* or this code to have a smoke control system or systems shall have such systems designed in accordance with the applicable requirements of Section 909, the *Clark County Fire Department Guideline for Smoke Control Testing & Recertification*, and the generally accepted and well-established principles of engineering relevant to the design. The *construction documents* shall include sufficient information and detail to describe adequately the elements of the design necessary for the proper implementation of the smoke control systems, these documents shall be accompanied with sufficient information and analysis to determine compliance with these provisions.

909.5.3 Opening protection – SN

909.5.3 Opening protection. Openings in *smoke barriers* shall be protected by automatic-closing devices actuated by the required controls for the mechanical smoke control system. Door openings shall be protected by *fire door assemblies* complying with Section 716 of the *International Building Code*.

Exceptions:

1. Passive smoke control systems with automatic-closing devices actuated by spot-type smoke detectors *listed* for releasing service installed in accordance with Section 907.3.
2. Fixed openings between smoke zones that are protected utilizing the airflow method.
3. In Group I-1, Condition 2; Group I-2; and ambulatory care facilities, where a pair of opposite-swinging doors are installed across a *corridor* in accordance with Section 909.5.3.1, the doors shall not be required to be protected in accordance with Section 716 of the *International Building Code*. The doors shall be close-fitting within operational tolerances and shall not have a center mullion or undercuts in excess of ¾ inch (19.1 mm), louvers or grilles. The doors shall have head and jamb stops and astragals or rabbets at meeting edges and, where permitted by the door manufacturer's listing, positive-latching devices are not required.
4. In Group I-2 and ambulatory care facilities, where such doors are special-purpose horizontal sliding, accordion or folding door assemblies installed in accordance with Section 1010.3.3 and are automatic closing by smoke detection in accordance with Section 716.2.6.6 of the *International Building Code*.
5. Group I-3.
6. Openings between smoke zones with clear ceiling heights of 14 feet (4267 mm) or greater and bank-down capacity of greater than 20 minutes as determined by the design fire size.
7. Door openings in *smoke barriers* shall be permitted to be protected by self-closing fire doors in the following locations:
    - 7.1. Guest rooms.
    - 7.2. Individual *dwelling units*.
    - 7.3. Mechanical rooms.
    - 7.4. Elevator machine rooms.
    - 7.5. Electrical rooms used exclusively for that purpose.
    - 7.6. Doors typically maintained in a closed position as *approved* by the *Building Official*.

909.16 Firefighter's smoke control panel – SN

909.16 Firefighter's smoke control panel. An *approved* firefighter's smoke control panel for fire department emergency response purposes only shall be provided and shall include manual control or override of automatic control for mechanical smoke control systems. The panel shall be located in a *fire command center* complying with Section 508 in high-rise buildings or buildings with smoke-protected assembly seating. In all other buildings, the firefighter's smoke control panel shall be installed in an *approved* location adjacent to the fire alarm control panel. The firefighter's smoke control panel shall comply with Sections 909.16.1 through 909.16.3. When *approved* by the *fire code official* an alternate means of display may be used.

909.16.1 Smoke control systems. Fans within the building shall be shown on the firefighter's control panel. A clear indication of the direction of airflow and the relationship of components shall be displayed. Status indicators shall be provided for all smoke control equipment, annunciated by fan and zone and by pilot-lamp-type indicators as follows:

1. Fans, dampers and other operating equipment in their normal status—GREEN.
2. Fans, dampers and other operating equipment in their off or smoke mode status—RED.
3. Fans, dampers and other operating equipment in their on or ancillary smoke mode status—BLUE.
4. Fans, dampers and other operating equipment in a fault status—YELLOW/AMBER.

909.16.2 Smoke control panel. The firefighter's control panel actions shall be in accordance with Section 909.23.

909.16.3 Control action and priorities. The firefighter's control panel actions shall be in accordance with Section 909.23.

909.18 Acceptance testing – SN/CC

909.18 Acceptance testing. Devices, equipment, components and sequences shall be individually tested. These tests, in addition to those required by the *Clark County Fire Department Guideline for Smoke Control Testing & Recertification* and other provisions of this code, shall consist of determination of function, sequence and, where applicable, capacity of their installed condition.

909.18.8.3 Reports – SN

909.18.8.3 Reports. A complete report of testing shall be prepared by the *approved agency*. The report shall include identification of all devices by manufacturer, nameplate data, design values, measured values and identification tag or mark. The report shall be reviewed by the responsible Nevada *registered design professional* and, when satisfied that the design intent has been achieved, the responsible Nevada *registered design professional* shall sign, seal and date the report with a statement as follows:

> "I have reviewed this report and by personal knowledge and on-site observation certify that the applicable smoke control system(s) are in substantial compliance with the design intent, and to the best of my understanding complies with requirements of the code."

909.18.8.3.1 Report filing. A copy of the final report shall be filed with the *building official* or *fire code official* and an identical copy shall be maintained in an *approved* location at the building.

909.18.10 Alternative testing method – SN

909.18.10 Alternative testing method. When required by the *building official* or *fire code official*, theatrical smoke or other *approved* tracer gases shall be used during final acceptance testing to visually verify air movement.

909.20.4.1 Dampered relief opening – SN

909.20.4.1 Dampered relief opening. A controlled relief vent capable of discharging a minimum of 2,500 cfm (1180 L/s) of air at the design pressure difference shall be located in the upper portion of the pressurized stair enclosure.

909.22 Maintenance – SN/CC

909.22 Maintenance. Smoke control systems shall be maintained to ensure to a reasonable degree that the system is capable of controlling smoke for the duration required. The system shall be maintained in accordance with the *Clark County Fire Department Guideline for Smoke Control Testing & Recertification*, the manufacturer's instructions, and Sections 909.22.1 through 909.23.

909.22.4 Dedicated smoke control systems – SN

909.22.4 Dedicated smoke control systems. Dedicated smoke control systems shall be operated for each control sequence semiannually. The system shall be tested under standby power conditions. When *approved* by the *building official* or *fire code official*, the system may be tested under normal power conditions.

909.22.5 Nondedicated smoke control systems – SN

909.22.5 Nondedicated smoke control systems. Nondedicated smoke control systems shall be operated for each control sequence annually. The system shall be tested under standby power conditions. When *approved* by the *building official* or *fire code official*, the system may be tested under normal power conditions.

909.23 Firefighter's smoke control panel for mechanical smoke control systems – SN

909.23 Firefighter's smoke control panel for mechanical smoke control systems.

909.23.1 Scope. This section applies to requirements regarding the design, installation, operation, and approval process for a Firefighter's Smoke Control Panel for Mechanical Smoke Control Systems.

909.23.2 Required items. The Firefighter Smoke Control Panel shall provide graphics depicting the protected facility and smoke control fan locations. The panel shall provide control switches to allow manual override and control of smoke control systems within the facility. Light Emitting Diodes (LEDs) shall be provided on the panel for the purpose of annunciation of smoke control systems, smoke control fans, smoke control dampers, and additional items as described.

909.23.2.1 Graphic display. The building layout must be graphically represented to clearly indicate location and boundaries of smoke zones with respect to adjacent areas. All walls and doors comprising the egress system for all smoke control zones must be shown on the graphics layout. The majority of graphics will be shown on a plan view. An exception is allowed for high-rise buildings having common floor plans and one smoke zone per high-rise floor, where a section view of the tower can be allowed in conjunction with plan views of typical tower floors. At a minimum, the panel must satisfy the following requirements:

1. Show a north directional arrow.
2. Show a building layout at an indicated scale on a contrasting background; black and white are acceptable colors for the graphic outlines and for the panel background.
3. The maximum height of any portion of the panel shall be 7'-0" above the finished floor, and the minimum height of any portion of the panel shall be 2'-6" from the floor.

4. Include a panel title block, indicating the facility name and address, and the title "Firefighter Smoke Control Panel."
5. Label each smoke zone area; the label shall include the floor level, i.e., SZ 16-I shall be the first smoke zone on the 16th floor. Note: when the floor level above grade is different than the floor designation, provide both numbers; i.e. if the 3rd level above grade is designated as level 15 in the elevators; provide both designations on the panel.
6. Designate between active and passive smoke zones by shading/background.
7. Show all floor and roof levels for all areas.
8. Label the locations of the *fire command center*, fire pump, and emergency generators, elevators providing access to all floor and roof levels, stairs providing access to all floor and roof levels, and secondary response point.
9. Show the location of all fan units providing smoke control function (both automatic and mop-up fans) and clearly indicate the direction of airflow from each smoke zone to the fan unit protecting that zone. Labels must be provided for each fan and for each opening associated with a fan. Therefore, if there is a fan on the building roof that serves the first level by exhausting air through an opening on the first level, the fan unit, clearly labeled, must be shown on the roof graphic, and the exhaust opening must be shown on the first level, clearly labeled as an exhaust opening associated with the fan.
10. Label fans with a Hand/Auto switch allowing for manual control at the unit.
11. Contain LEDs as required. LED annunciation is required for each smoke zone (including passive zones utilizing only dampers), each smoke control fan, each group of smoke control dampers/doors, each stair pressurization fan, each elevator pressurization fan, each mop-up system, for "Abnormal Switch Position", and for power. For smoke fans and pressurization fans, the associated LED shall be close to the graphical representation of the fan.
12. Contain switches for manual control/override of each smoke zone (including passive zones utilizing only dampers), each stair pressurization system, each elevator pressurization system, each mop-up system, and each elevator hoist way vent damper.
13. Contain a button for lamp test.
14. Provide a legend for all symbols, including fans, supply/exhaust openings, etc, and for the LEDs provided on the panel.

909.23.2.2 Control switches and buttons. Manual control switches must be provided at the panel. The switches shall allow for manual activation of smoke control sequences and override of automatic smoke control sequences. Control switches shall be provided for each individual active and passive smoke zone, for each stair and elevator pressurization system, for mop-up systems, and for elevator hoist way vents. Control switches shall be adjacent to LEDs associated with each switch. Switches shall be three-position, even for dual-mode smoke zones. Each physical position of the control switch shall be labeled, utilizing "smoke mode — auto — off" labels for smoke zones, "press — auto — off" labels for pressurization systems, "manual purge — auto — off" labels for mop-up systems, and "open — auto — close" labels for elevator hoist way vents.

Control switches shall be provided for:

1. Each smoke zone: the switch for the smoke zone is required to have "smoke mode — auto — off" positions labeled. In "smoke mode" the switch is required to activate all smoke control components, including fans, dampers, and doors, that are required to automatically activate to provide the smoke control function, as dictated on the smoke control diagrams. In the "off" position, the switch is required to move all fans and dampers to a "passive" mode by shutting down all fans and closing all dampers serving that zone. This switch in the "off' position shall not inhibit any stair pressurization or elevator pressurization systems from activating again under a separate scenario. In the "auto" position, the FACP function is allowed to dictate the status of the smoke control system.

2. Each pressurization system: a switch is required to provide manual control of the fan(s) providing air supply to pressurize an enclosure, such as an egress stair and an elevator machine room. The switch for each pressurization system is required to have "press — auto — off" positions labeled. In "press", the switch will activate all pressurization fans required for the pressurized enclosure. This switch in "press" will override automatic controls, including duct detector shut down of the fan. In the "off" position, the fan must be released from all initiation commands from the FACP; no other activation of a smoke control system by the FACP will override the "off" position and turn the fan back on. In the "auto" position, the FACP function will dictate the fan function.
3. Each mop-up system: the switch for each mop-up system that is only manually activated for mop-up purpose is required to have "manual purge — auto — off" positions labeled. In "manual purge" the switch will activate fans and dampers that are required to configure to achieve the exhaust mode. In the "auto" position, the normal building function will dictate the functioning of all fans and dampers. In the "off" position the switch is required to move all fans and dampers to a "passive" mode by shutting down all fans and closing all dampers serving that zone.
4. Each elevator hoist way vent: the switch for each elevator hoist way vent is required to have "open — auto — close" positions labeled. In "open" the switch will open the elevator hoist way vent dampers. In the "auto" position, the FACP will dictate the status of the vent dampers, with respect to the lobby smoke detectors associated with the hoist way. In the close position the switch is required to move the damper to a "passive" mode by closing the damper.

Switches shall be located on the Firefighter Smoke Control Panel reasonably close to the graphical depiction of the associated area/component. There is no requirement for a separate control switch for a smoke control fan or fire dampers that are part of an automatic sequence.

909.23.2.3 Annunciation. Status of smoke control systems and components are required to be indicated on the Firefighter's Smoke Control Panel. Status shall be provided for general conditions, each individual smoke zone, each smoke control fan, each pressurization fan, and all dampers/doors. Status shall be indicated using LEDs. Acceptable LED colors are red, yellow, green, and blue. Red-yellow-green LED sets shall be provided for each smoke zone, smoke control fan (including mop-up fans), damper/group of dampers, and each pressurization fan. Dual-mode zones and fans shall be provided with red-yellow-green-blue LED sets.

909.23.3 General LED Status. There are general panel status situations that are required to be indicated by LEDs. These include whether there is power to the panel, and whether any switch on the panel has been moved from "auto" to another position.

909.21.3.1 General, yellow: There shall be a yellow indicator light that will illuminate when any switch on the fire-fighter's smoke control panel has been turned from "auto" or set to any position that will override automatic function of a smoke control system or component. The label adjacent to the yellow LED shall state "Abnormal Switch Position."

909.23.3.2 General, green: There shall be a green indicator light that will illuminate to indicate that the Firefighter's Smoke Control Panel is powered. The label adjacent to this green LED shall state "Power On."

909.23.3.3 LED legend: A legend of LEDs shall be provided. The legend LED shall continuously be lit. The legend shall indicate the following colors and labels:

1. Red LED — Smoke Mode
2. Yellow LED — Trouble
3. Green LED — Normal
4. Blue LED — Ancillary Smoke Mode (only for dual mode fans and zones)

909.23.3.4 Smoke Control Components. LEDs are required to indicate status of the smoke control system components. LEDs shall be provided for Smoke Zones, Smoke Control Fans, Mop-Up Systems, Smoke Zone Dampers/Doors, Elevator Hoist Way Vents, and Pressurization Systems. All of these shall have red-yellow-green LED sets. Dual-mode zones and fans shall add a blue LED for indication of the ancillary smoke mode.

The various LEDs shall operate as follows:

1. Red Only: Shall be illuminated when the FACP or the associated manual switch is activating the smoke control zone and/or components and all components required to activate have been monitored to be in the required position/operation for that scenario.
2. Green Only: Shall be illuminated to indicate normal mode when there is no initiation by the FACP or associated manual switch for the smoke zone and components and all required status for smoke control components indicate that the components are ready for operation.
3. Blue Only: Shall be illuminated when the FACP or the associated manual switch is initiating the smoke control zone and/or components into its ancillary smoke control mode and the monitoring for the fan and dampers required to achieve the ancillary smoke control mode indicates that the system is operating in its required mode. An ancillary smoke control mode means that the smoke zone served by the smoke control system is not in alarm, but the system must configure to support smoke control for another smoke zone that is in alarm.
4. Yellow Only: There shall be no situation where only a yellow LED is illuminated. The yellow LED shall only illuminate in conjunction with a blue LED, red LED or green LED.
5. Red and Yellow: A combination of the red and yellow LEDs shall illuminate to indicate that the smoke zone and/or component is being initiated by the FACP or the associated manual switch, and positive status indicating proper configuration of smoke zone components has not been received.
6. Green and Yellow: A combination of green and yellow LEDs shall illuminate when a smoke zone is not initiated and the smoke control components do not report normal operating status. For instance, this may occur when a damper is closed due to loss of power, or there is a loss of power required for a smoke control fan.
7. Blue and Yellow: A combination of the blue and yellow LEDs shall illuminate to indicate that an auxiliary smoke control sequence is being initiated by the FACP or the associated manual switch, and positive status indicating proper configuration of components for the ancillary smoke control mode has not been received.

909.23.4 Sequence of operations. Smoke control sequences shall be programmed such that operation of fans and dampers associated with the smoke control system does not result in physical damage in any smoke control system components.

909.23.4.1 Multiple configurations. In no case is the smoke control system required to configure for more than one smoke zone at the same time.

909.23.4.2 Operation and timing. Upon automatic activation of a device programmed to initiate a smoke control system, the smoke control system shall automatically configure all smoke control components in a manner to avoid damage to components. All components shall be configured to smoke control status and annunciation of status shall be indicated on the Firefighter Smoke Control Panel within 60 seconds of the initiating alarm being received at the FACP.

909.23.4.3 Automatic activation. Under automatic-only activation, the smoke control system shall configure components in the zone where the first device that initiates smoke control is activated.

909.23.4.4 Manual activation. Under manual-only activation, the smoke control system shall configure components to their proper smoke mode operation in the zone associated with the manual switch.

909.23.4.5 Stacked automatic and manual activations. For stacking of automatic and manual switch activation, the manual switch shall have override capability over the automatic sequence.

909.23.4.6 Switch overrides. Switches for pressurization fans shall not override manual or automatic function for smoke control systems covering areas or zones. Similarly, switches for a smoke zone shall not override manual or automatic function for pressurization fans.

909.23.5 Approval requirements.

909.23.5.1 Submittals. Submittals shall include, plans for all proposed smoke control graphic panels, narrative describing the sequence and operation for all LEDs and switches, and a copy of the *approved* smoke control diagrams for review.

909.23.5.2 Plans. Plans shall be drawn to an indicated scale. Panel drawings must indicate location of switches and LEDs against the panel outline.

909.23.5.3 Narrative. The narrative shall indicate compliance with section 909 and describe the initial and override sequence for all buttons and switches shown on the graphic panel. The narrative shall be formatted as an instruction sheet. Copies of the *approved* narrative shall be laminated and attached to the Firefighter Smoke Control Panel for use by the fire department in an emergency. The narrative must describe:

1. General operation of smoke control systems.
2. LED operation for automatic and manual switch sequence of each smoke zone and/or component.
3. Override of control switch for each smoke zone and smoke control component.

909.23.5.4 Testing. Testing of the smoke control panel operation must be included in the third-party testing of the smoke control system. Final acceptance includes approval of the third-party test report and testing of the LEDs and control switches at the final All-Systems test.

910.1 General – SN

910.1 General. Where required by this code or otherwise installed, smoke and heat vents or smoke removal systems shall conform to the requirements of this section.

910.2 Where required – SN

910.2 Where required. Smoke and heat vents or a smoke removal system shall be installed as required by Sections 910.2.1, 910.2.2, and 910.6.

Exceptions:

1. Frozen food warehouses used solely for storage of Class I and II commodities where protected by an *approved automatic sprinkler system*.
2. Smoke and heat removal shall not be required in areas of buildings equipped with early suppression fast-response (ESFR) sprinklers.
3. Smoke and heat removal shall not be required in areas of buildings equipped with control mode special application sprinklers with a response time index of $50(m \times s)^{1/2}$ or less that are *listed* to control a fire in stored commodities with 12 or fewer sprinklers.

910.6 High rise buildings – SN

910.6 High rise buildings. Smoke removal systems in high rise buildings shall be installed in accordance with Section 403.4.7 of the *International Building Code*.

910.6.1 Status Indicators and Controls. Status indicators and controls shall be designed in accordance with Section 403.4.7.1.4 of the *International Building Code* and the *fire code official's* guidelines.

910.6.2 Maintenance. Smoke removal systems in high rise buildings shall be maintained in an operable condition at all times to ensure to a reasonable degree that the system is capable of removing smoke when required. Inspection and periodic testing of smoke removal systems shall be performed in accordance with the *Clark County Fire Department Guideline for Smoke Control Testing & Recertification* using a Level I inspection firm, and the manufacturer's instructions.

912.1 Installation – CC

912.1 Installation. Fire department connections shall be installed in accordance with the NFPA standard applicable to the system design and shall comply with sections 912.2 through 912.8.

912.4.2 Clear space around connections – SN

912.4.2 Clear space around connections. A working space of not less than 36 inches (914 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height, not including any doors or windows, shall be provided and maintained in front of and to the sides of wall-mounted fire department connections and around the circumference of free-standing fire department connections, except as otherwise required or *approved* by the *fire code official*.

> **Exception:** The fire department connection may be permitted within 36 inches (914 mm) of the fire riser room door opening as long as it is mounted on the opposite side of the hinges.

912.8 Required sizes – CC

912.8 Required sizes. *Automatic sprinkler systems* with a demand of up to and including 500 gpm shall be installed with a siamese with two 2½-inch. (65 mm) inlets. *Automatic sprinkler systems* with a demand greater than 500 gpm and an inlet pressure requirement not exceeding 150 psi shall be installed with a single, thread-less coupling consisting of one 5-inch (130 mm) Storz brand locking connection with a 30–45-degree downward deflection. When the system demand exceeds 150 psi, the system shall include one 2½-inch (65 mm) inlet per every 250 gpm (956 L/min) demand. Modifications or alternate designs shall be *approved* by the *fire code official*.

Fire department connection piping shall be a minimum of 4-inch (100 mm) for three or fewer inlets, a minimum of 6 in (150 mm) for four or more inlets or a Storz inlet and shall have a diameter equal or greater to the largest supply main.

913.1.1 Redundant pumps in high-rise structures – SN

913.1.1 Redundant pumps in high-rise structures. Where pumps are used in structures with an occupied floor or occupied roof located greater than 250 feet (76 200 mm) above the lowest level of fire department vehicle access, a redundant fire pump shall be provided for each required fire pump.

913.1.2 Redundant pumps in multiple buildings – SN

913.1.2 Redundant pumps in multiple buildings. Where a fire pump is used for booster pressure supply to multiple buildings, a redundant fire pump shall be provided for each required fire pump.

> **Exception:** Where a single building is constructed above a podium building in accordance with Section 510.2 of the *International Building Code*, a redundant fire pump configuration is not required.

913.1.3 Redundant pump arrangements with electric pumps – SN

913.1.3. Where redundant pumps are required, electric driven fire pump drivers will be provided with emergency power.

> **Exception:** Where an alternatively powered redundant pump is utilized, i.e. electric primary and diesel, or other non-electric, secondary pump driver is provided, emergency power is not required for electric, primary, fire pump driver.

913.2.3 Drains – SN

913.2.3 Drains. Floor drains having a minimum diameter of 3 inches (76.2 mm) shall be provided in the fire pump room.

914.3.1 Automatic sprinkler system – SN

914.3.1 Automatic sprinkler system. Buildings and structures shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 and a secondary water supply where required by Section 914.3.2.

914.3.2 Secondary water supply – SN

914.3.2 Secondary water supply. An automatic dedicated secondary on-site water supply having a capacity not less than the hydraulically calculated sprinkler demand, including the hose stream requirement in accordance with Section 903.3.1.1, but not less than 15,000 usable gallons (56 781 L), shall be provided for high-rise buildings. An additional fire pump shall not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the *automatic sprinkler system*. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with Section 903.3.1.1.

914.3.2.1 Secondary water supply design options – SN

914.3.2.1 Secondary water supply design options. Secondary water tanks that intercept the water supply shall be designed to allow for continued fire protection when the secondary tank is taken out of service in accordance with 914.3.2.1.1 through 914.3.2.1.3.

914.3.2.1.1 For secondary water tanks supplying horizontal split case fire pump(s) or other fire pump(s) that can take a piped water supply, a bypass shall be installed around the secondary water tank to allow for temporary supply to the fire protection system during the repair of the secondary water tank.

914.3.2.1.2 For secondary water tanks supplying vertical turbine pump(s) or other fire pump(s) that cannot accept a piped supply, the secondary water supply shall be split into two separate tanks, each not less than one half of the required water capacity, interconnected by pipe with sectional valves, with redundant pumping and automatic water filling capabilities. This tank arrangement shall be such as to permit one of the two tanks to be drained and have maintenance performed while maintaining an operational fire protection system for the building served.

914.3.2.1.3 Alternate engineering solution that provides a water supply while the secondary tank is out of service *approved* by the *fire code official*.

914.4.1 Automatic sprinkler system – SN

914.4.1 Automatic sprinkler system. An *approved automatic sprinkler system* shall be installed throughout the entire building.

914.6.1 Automatic sprinkler system – SN

914.6.1 Automatic sprinkler system. Stages shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the stage. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such stages.

Exceptions:

1. In buildings where an *automatic sprinkler system* is not otherwise required by other sections of this code, sprinklers are not required for *stages* 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
2. Sprinklers are not required within portable orchestra enclosures on stages.
3. Sprinklers are not required under catwalks and galleries where they are permitted to be omitted in accordance with Section 903.3.1.1.

914.8.3 Fire suppression for aircraft hangars – SN

914.8.3 Fire suppression for aircraft hangars. Aircraft hangars shall be provided with a fire suppression system designed in accordance with NFPA 409, based on the classification for the hangar given in Table 914.8.3.

Exception: For the protection of aircraft storage and servicing areas of Group II aircraft hangars where hazardous operations, including but not limited to fuel transfer, welding, torch cutting, torch soldering, doping, hot work (e.g., welding, cutting, brazing, grinding), spray painting, oxygen service, composite repairs, fuel system or fuel tank maintenance, aircraft cabling, wiring changes, or initial electrical system testing, are not performed, a closed-head *automatic sprinkler system* in accordance with NFPA 409 shall be permitted.

1006.2.1 Egress based on occupant load and common path of egress travel distance – SN

[BE] 1006.2.1 Egress based on occupant load and common path of egress travel distance. Two *exits* or *exit access doorways* from any space shall be provided where the design *occupant load* or the *common path of egress travel* distance exceeds the values listed in Table 1006.2.1. The cumulative *occupant load* from adjacent rooms, areas or spaces shall be determined in accordance with Section 1004.2.

Exceptions:

1. The number of *exits* from foyers, lobbies, vestibules or similar spaces need not be based on cumulative *occupant loads* for areas discharging through such spaces, but the capacity of the *exits* from such spaces shall be based on applicable cumulative *occupant loads*.
2. Care suites in Group 1-2 occupancies complying with Section 407.4 of the *International Building Code*.
3. Unoccupied mechanical rooms and penthouses are not required to comply with the *common path of egress travel* distance measurement.

[BE] TABLE 1006.2.1 – SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY				
OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without Automatic Sprinkler System (feet)		With Automatic Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A[c], E, M	49	75	75	75[a]
B	49	100	75	100[a]
F	49	75	75	100[a]
H-1, H-2, H-3		NP	NP	25[b]
H-4, H-5		NP	NP	75[b]
I-1, I-2[d], I-4		NP	NP	75[a]
I-3		NP	NP	100[a]
R-1	20	NP	NP	125[a]
R-2		NP	NP	125[a]
R-3[e]		NP	NP	125[a, g]
R-4[e]		NP	NP	125[a, g]
S[f]	29	100	75	100[a]
U	49	100	75	75[a]

For SI: 1 foot = 304.8 mm.

NP = Not Permitted

a. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2

b. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.

c. For a room or space used for assembly purposes having fixed seating, see Section 1030.8.

d. For the travel distance limitations in Group 1-2, see Section 407.4 of the International Building Code.

e. The common path of egress travel distance shall apply only in a Group R-3 occupancy located in a mixed occupancy building or within a Group R-3 or R-4 congregate living facility.

f. The length of common path of egress travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3, see Section 1006.2.2.6.

1009.8.1 System requirements – SN

1009.8.1 System requirements. Two-way communication systems shall provide communication between each required location and the *fire command center* or a central control point location *approved* by the fire department. Where the central control point is not a constantly attended location, the two-way communication system shall have a timed automatic telephone dial-out capability that provides two-way communication with an *approved* supervising station. The two-way communication system shall include both audible and visible signals. Systems shall be listed in accordance with UL 2525 and installed in accordance with NFPA 72.

1010.1.7 Door arrangement – SN

[BE] 1010.1.7 Door arrangement. Space between two doors in a series shall be 48 inches (1219 mm) minimum plus the width of a door swinging into the space. Doors in a series shall swing either in the same direction or away from the space between the doors.

Exceptions:

1. The minimum distance between horizontal sliding power-operated doors in a series shall be 48 inches (1219 mm).
2. Storm and screen doors serving individual *dwelling units* in Groups R-2 and R-3 need not be spaced 48 inches (1219 mm) from the other door.
3. Doors within individual *dwelling units* in Groups R-2 and R-3 other than within Type A *dwelling units*.
4. The space between doors serving access vestibules of smokeproof enclosures shall be permitted to be in accordance with Section 909.20.1 of the *International Building Code*.

1027.5 Location – SN

[BE] 1027.5 Location. *Exterior exit stairways* and *ramps* shall be separated by a minimum distance of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramps*, including landings, to:

1. Adjacent lot lines or to the centerline of a street, alley or public way.
2. Other portions of the building and other buildings on the same lot.

For the purposes of this section, other portions of the building shall be treated as separate buildings.

Exceptions:

1. *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall be separated by a minimum distance of not less than 5 feet (1524 mm).
2. Where the adjacent building *exterior walls* and openings are protected in accordance with Section 705 of the *International Building Code* based on *fire separation distance*.

1030.2 Assembly main exit – SN

[BE] 1030.2 Assembly main exit. A building, room or space used for assembly purposes that has an *occupant load* greater than 300 shall be provided with a *main exit*. The *main exit* shall be of sufficient capacity to accommodate not less than one-half of the *occupant load*, but such capacity shall be not less than the total required capacity of all *means of egress* leading to the *exit*. Where the building is classified as a Group A occupancy, the *main exit* shall front on not less than one street or an unoccupied space of not less than 10 feet (3048 mm) in width that adjoins a street or *public way*. In a building, room or space used for assembly purposes where there is not a well-defined *main exit* or where multiple *main exits* are provided, *exits* shall be permitted to be distributed around the perimeter of the building provided that the total capacity of egress is not less than 100 percent of the required capacity.

1030.6.2.3 Automatic sprinklers – SN

[BE] 1030.6.2.3 Automatic sprinklers. Enclosed areas with walls and ceilings in buildings or structures containing *smoke-protected assembly seating* shall be protected with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1.

1030.6.3.1 Automatic sprinklers – SN

[BE] 1030.6.3.1 Automatic sprinklers. Enclosed areas with walls and ceilings in buildings or structures containing *open-air assembly seating* shall be protected with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1.

Exception: *Open-air assembly seating* facilities where seating and the *means of egress* in the seating area are essentially open to the outside.

Chapter 11 Construction requirements for existing buildings – SN

CHAPTER 11 CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

1101.1 Scope. Chapter 11 of the IFC is deleted in its entirety. All references to Chapter 11 throughout this code are also deleted. The edition of the *International Existing Building Code* referenced in Chapter 80 shall be applicable.

1207.11.3 Location – CC

1207.11.3 Location. ESS shall be installed only in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the *dwelling unit* living space and *sleeping units* in accordance with Section 406.3.2 of the *International Building Code*.
3. Outdoors or on the exterior side of exterior walls located a minimum of 3 feet (914 mm) from doors and windows directly entering the *dwelling unit* and a minimum of 3 feet (914 mm) from *lot lines*.
4. Enclosed utility closets, *basements*, and storage or utility spaces within *dwelling units* and *sleeping units* with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than 5/8-inch Type X gypsum wallboard.

ESS shall not be installed in sleeping rooms, or in closets or spaces opening directly into sleeping rooms. (Material based on NFPA 855 2023 Ed.)

2007.1 General – CC

2007.1 General. Helistops and heliports shall be designed and constructed in accordance with this code and NFPA 418. Helistops and heliports shall be maintained in accordance with Sections 2007.2 through 2007.8. Helistops and heliports on buildings shall be constructed in accordance with the *International Building Code*.

2007.5 Standpipe systems – SN

2007.5 Standpipe systems. A building with a rooftop helistop or heliport shall be provided with a Class I or III standpipe system extended to the roof level on which the helistop or heliport is located. All portions of the helistop and heliport area shall be within 100 feet (30 480 mm) hose and 30 feet (9144 mm) stream of a 2 ½-inch (63.5 mm) outlet on the standpipe system.

2304.2.4 Obstructions to view – SN

2304.2.4 Obstructions to view. The attendant shall have a direct line of sight to observe fuel-dispensing operations at all times. Obstructions shall not be placed between the dispensing area and the attendant.

> **Exception:** Video monitoring systems or other acceptable alternatives shall be permitted to supplement direct line of sight supervision where *approved* by the *fire code official*. Plans documenting camera and video monitor locations or other alternatives shall be submitted to the *fire code official* for review and approval prior to installation.

2404.4 Location of spray-finishing operations – SN

2404.4 Location of spray-finishing operations. Spray finishing operations conducted in building areas used for Group A, E, I or R occupancies shall be located in a spray room protected with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 and separated vertically and horizontally from the remainder of the building by *fire barrier* walls and *horizontal assemblies* with not less than a 1-hour *fire-resistance rating* in accordance with the *International Building Code*. In other occupancies, spray-finishing operations shall be conducted in a spray room, spray booth, or limited spraying space *approved* for such use.

> **Exceptions:**

1. Automobile undercoating spray operations and spray-on automotive lining operations conducted in areas with *approved* natural or mechanical ventilation shall be exempt from the provisions of Section 2404 when *approved* and where utilizing Class IIIA or IIIB *combustible liquids*.
2. In buildings other than Group A, E, I or R occupancies, *approved* limited spraying space in accordance with Section 2404.11.
3. Resin application areas used for manufacturing of reinforced plastics complying with Section 2409 shall not be required to be located in a spray room, spray booth or spraying space.

2810.6 Clearance to property line – CC

2810.6 Clearance to property line. Stacks of pallets shall not be stored a distance equal to the stack height or 10 feet (3048 mm) of the property line, whichever is greater, or shall comply with Section 2810.11.

2810.7 Clearance to important buildings and other on-site storage – CC

2810.7 Clearance to important buildings and other on-site storage. Stacks of pallets shall be separated from all important buildings, other piles and on-site storage in accordance with Tables 315.7.6(1) through 315.7.6(4) or shall comply with Section 2810.11.

2810.8 Height and stack arrangement – CC

2810.8 Height and stack arrangement. Pallet stacks shall comply with the height and stack arrangement requirements of Sections 315.7 through 315.7.7.

2810.9 Fire flow, fire hydrants and fire department access – CC

2810.9 Fire flow, fire hydrants and fire department access. Fire-flow, fire hydrants and fire department access shall be in accordance with Sections 315.7.8 through 315.7.10.JUSTIFICATION: Fire hydrants and fire access lanes are not present in section 2810 and most codes in that section refer to “determined by the fire code official”, so this amendment establishes a code path and guidelines preventing officials from choosing different parameters.

3006.1 Required protection – CC

3006.1 Required protection. Class A and B ovens that contain, or are utilized for the processing of, combustible materials shall be protected by an *approved automatic-fire-extinguishing system* complying with Chapter 9.

Exceptions:

1. Small tabletop ovens used in laboratory facilities.
2. Nonwalk-in ovens that are less than 4 feet (1219 mm) in length and width.
3. Protection is not required for furnaces and ovens where the operation cannot create an area in which the concentration of flammable constituents (vapor, gas, fume, mist or dust) in air exceeds 25 percent of their *lower flammable limit (LFL)*.

3006.2 Fixed fire-extinguishing systems – CC

3006.2 Fixed fire-extinguishing systems. Fixed fire-extinguishing systems shall be provided for Class C or D ovens to protect against such hazards as overheating, spillage of molten salts or metals, quench tanks, ignition of hydraulic oil and escape of fuel. It shall be the user's responsibility to consult with the *fire code official* concerning the necessary requirements for such protection.

> **Exception:** Protection is not required for furnaces and ovens where the operation cannot create an area in which the concentration of flammable constituents (vapor, gas, fume, mist or dust) in air exceeds 25 percent of their *lower flammable limit (LFL)*.

3103.3 Outdoor assembly event – SN

3103.3 Outdoor assembly event. For the purpose of this chapter, an outdoor assembly event shall include a circus, carnival, fair, tent show, theater, skating rink, dance hall or other place of assembly in or under which persons gather for any purpose.

3103.7.4 Membrane structures on buildings – SN

3103.7.4 Membrane structures on buildings. *Membrane structures* that are attached to or erected on buildings, balconies, decks or other structures shall be regulated as permanent *membrane structures* in accordance with Section 3102 of *the International Building Code*.

3103.8 Structural stability and anchorage required – CC

3103.8 Structural stability and anchorage required. *Tents* or *membrane structures* and their appurtenances shall be designed and installed to withstand the elements of weather and prevent collapsing. Documentation of structural stability shall be furnished to the *fire code official*. Conformance to these code sections for structural stability and anchorage shall be documented by a Nevada-licensed professional engineer. Where a *tent* is intended to be re-used multiple times, a single structural analysis is permitted, provided the single analysis incorporates the worst-case soil and location conditions within the design. Such single structural analysis is only accepted during the current code edition and expires when a new code is adopted.

3103.8.1 Water-filled vessels. Water-filled vessels shall be permitted to be used where *approved* and in accordance with the *tent* or *membrane structure* manufacturer's load specifications.

3103.8.2 Tents and membrane structures greater than one story. *Tents* and *membrane structures* exceeding one story shall be designed and constructed to comply with Sections 1606 through 1609 or 3103.6 of the *International Building Code*.

3103.8.3 Tents and membrane structures greater than 7,500 square feet. *Tents* and *membrane structures* greater than 7,500 square feet (697 m^2) shall be designed and constructed to comply with Sections 1606 through 1609 or 3103.6 of the *International Building Code*.

3103.8.4 Tents and membrane structures with occupant load greater than 1,000. *Tents* and *membrane structures* with an occupant capacity greater than 1,000 persons shall be designed and constructed to comply with Sections 1606 through 1609 or 3103.6 of the *International Building Code*.

3103.8.5 Other tents and membrane structures. *Tents* and *membrane structures* that do not exceed one story, 7,500 square feet (697 m^2), or an occupant load of 1,000 persons, are permitted to document structural stability by means of conforming to manufacturer installation instructions. Analysis by a Nevada-licensed professional engineer is not required.

3201.3 Construction documents – SN

3201.3 Construction documents. At the time of building permit application for new structures designed to accommodate high-piled storage or for requesting a change of occupancy/use, and at the time of application for a storage permit, plans and specifications shall be submitted for review and approval. In addition to the information required by the *International Building Code*, the storage permit submittal shall include the information specified in this section. Following approval of the plans, a copy of the *approved* plans shall be maintained on the premises in an *approved* location. The *construction documents* shall include the following:

1. Floor plan of the building showing locations and dimensions of *high-piled storage areas*.
2. Usable storage height for each storage area
3. Number of tiers within each rack, if applicable.
4. Commodity clearance between top of storage and the sprinkler deflector for each storage arrangement.
5. Aisle dimensions between storage array.
6. Maximum pile volume for each storage array.
7. Location and classification of commodities in accordance with Section 3203.
8. Location of commodities which are banded or encapsulated.
9. Location of required fire department access doors.
10. Type of fire protection systems.
    - 10.1. For density/area fire sprinklers protecting the high-piled storage area, indicate the sprinkler identification number (SIN), the sprinkler k factor, square footage of the remote area, and the system design density. If the SIN is not available, a copy of the manufacturer specification sheet for the sprinkler head is required.
    - 10.2. For specific application sprinklers, such as large-drop and ESFR sprinklers, protecting the high-piled storage area, indicate the sprinkler identification number (SIN), the sprinkler k factor, the number of sprinkler heads in the remote area, and the minimum residual pressure provided at the most hydraulically demanding sprinkler head. If the SIN is not available, a copy of the manufacturer specification sheet for the sprinkler head is required.
11. Location of valves controlling the water supply of ceiling and in-rack sprinklers.
12. Type, location, and specifications of smoke removal and curtain board systems.
13. Dimension and location of transverse and longitudinal flue spaces.
14. Additional information regarding design features, commodities, storage arrangement and fire protection features within the *high-piled storage area* shall be provided at the time of permit, where required by the *fire code official*.
15. Type of shelving material used, whether it is solid, slatted, or wire mesh.
16. Verification of sufficient fire flow provided for the building, when required by the *fire code official*.
17. Indicate path of travel for all storage areas to the *exits*.

3307.2 Water supply for fire protection – SN

3307.2 Water supply for fire protection. An *approved* water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible building materials arrive on the site, on commencement of vertical combustible construction and on installation of a standpipe system in buildings under construction, in accordance with Sections 3307.2.1 through 3307.4. The required volume of fire flow shall be based on the fire flow required for the building/facility when constructed, with reductions permitted as set forth in this section. In all cases, a minimum fire flow of 1,500 gallons per minute (5678 L/m) shall be required.

> **Exception:** The *fire code official* is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

3307.2.1 Combustible building materials. When combustible building materials of the building under construction are delivered to a site, the fire hydrant used to provide this fire-flow supply shall be within 300 feet (91.44 m) of the combustible building materials, as measured along an *approved* fire apparatus access lane. Where the site configuration is such that one fire hydrant cannot be located within 300 feet (91.44 m) of all combustible building materials, additional fire hydrants shall be required to provide coverage in accordance with this section.

3307.2.2 Vertical construction of Types III, IV and V construction. Prior to commencement of vertical construction of Type III, IV or V buildings that utilize any combustible building materials, the fire flow required by Section 3307.2 shall be provided, accompanied by fire hydrants in sufficient quantity to deliver the required fire flow and proper coverage.

3307.2.2.1 Fire separation up to 30 feet. Where a building of Type III, IV or V construction has a *fire separation distance* of less than 30 feet (9144 mm) from property *lot lines*, and an adjacent property has an existing structure or otherwise can be built on, the water supply shall provide either a minimum of 1500 gallons per minute (5678 L/m) or the entire fire flow required for the building when constructed, whichever is greater.

3307.2.2.2 Fire separation of 30 feet up to 60 feet. Where a building of Type III, IV or V construction has a *fire separation distance* of 30 feet (9144 mm) up to 60 feet (18 288 mm) from property *lot lines*, and an adjacent property has an existing structure or otherwise can be built on, the water supply shall provide a minimum of 1500 gallons per minute (5678 L/m) or 50 percent of the fire flow required for the building when constructed, whichever is greater.

3307.2.2.3 Fire separation of 60 feet or greater. Where a building of Type III, IV or V construction has a *fire separation distance* of 60 feet (18 288 mm) or greater from a property *lot line*, a water supply of 1500 gallons per minute (5678 L/m) shall be provided.

3307.4 Standpipe supply – SN

3307.4 Standpipe supply. Regardless of the presence of combustible building materials, the construction type or the fire separation distance, where a standpipe is required in accordance with Section 3307.5, a water supply providing a minimum flow of 1500 gallons per minute (5678 L/m) shall be provided. The fire hydrant used for this water supply shall be located within 100 feet (30 480 mm) of the fire department connection supplying the standpipe.

3307.6 Combustible loading (stocking) – SN

3307.6 Combustible loading (stocking). Where combustible loading (stocking) of the building has been *approved* by the *fire code official*, the fire flow provided shall be equal to 100% of the fire flow required at the time of building occupancy.

3307.7 Occupancy of building – SN

3307.7 Occupancy of building. Prior to occupancy of the completed building, the required fire flow shall be provided and flow tested to verify the water system's capability to supply the required fire flow. All acceptance testing shall be witnessed by the *fire code official*.

3307.8 Site identification sign – SN

3307.8 Site identification sign. The street address of the construction site shall be posted on the street side of the site. Signage shall have *approved* address numbers, building numbers, or *approved* building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Signage shall have nominal 12" high (305 mm), 1" (25 mm) stroke numbering and lettering.

3604.2 Standpipes – SN

3604.2 Standpipes. Marinas and boatyards shall be equipped throughout with standpipe systems in accordance with NFPA 303. Systems shall be provided with hose connections located such that no point on the marina pier or float system exceeds 100 feet (30 480 mm) hose and 30 feet (9144 mm) stream from a standpipe hose connection.

3903.3 Location – SN

3903.3 Location. The extraction equipment and extraction processes utilizing hydrocarbon solvents or other organic liquids shall be located in a room or area dedicated to extraction. A listed spray booth conforming to the requirements of Section 2404.5.3 or a pre-engineered extraction booth may be used for this purpose.

3903.5 Use of flammable and combustible liquids – SN

3903.5 Use of flammable and combustible liquids. The use of *flammable* and *combustible liquids* for liquid extraction processes where the liquid is boiled, distilled or evaporated shall be located within a hazardous exhaust fume hood or pre-engineered extraction booth, rated for exhausting flammable vapors. Electrical equipment used within the hazardous exhaust fume hood or pre-engineered extraction booth shall be rated for use in flammable atmospheres. Heating of *flammable* or *combustible liquids* over an open flame is prohibited.

> **Exception:** The use of a heating element not rated for flammable atmospheres, where documentation from the manufacturer, or *approved* testing laboratory indicates the element is rated for heating of *flammable liquids*.

3905.1 Gas detection – SN

3905.1 Gas detection. For extraction processes utilizing flammable or combustible liquids or gases as solvents, a *gas detection system* complying with Section 916 shall be provided.

3905.1.1 Operation – SN

3905.1.1 Operation. Activation of the *gas detection system* shall result in all the following:

1. Initiation of distinct audible and visual alarm signals in the extraction room.
2. Deactivation of all heating systems located in the extraction room.

3. Activation of the mechanical ventilation system where the ventilation rate provided is such that the air velocity over the cross-section of the extraction room in the direction of air flow is a minimum of 100 linear feet per minute.
4. De-energize all light switches and electrical outlets.

4104.2 Open-flame cooking devices – SN

4104.2 Open-flame cooking devices. Charcoal burners and other open-flame cooking devices shall not be located above the first story, operated on combustible balconies or within 10 feet (3048 mm) of combustible construction.

Exceptions:

1. One- and two-family *dwellings* and *townhouses*.
2. Where buildings, balconies and decks are protected by an *automatic sprinkler system*, open flame cooking devices utilizing natural gas installed under a construction permit issued by the *building official*.

4105.1 Portable electric cooking appliances – SN

4105.1 Portable electric cooking appliances. Portable electric cooking appliances shall be permitted to be used in all occupancies in accordance with Sections 4105.1.1 through 4105.2.

4105.2 Open-flame cooking devices – SN

4105.2 Open-flame cooking devices. Electric barbecues and other portable electric cooking appliances that have the potential to produce open flames, shall not be located above the first story, operated on combustible balconies or within 10 feet (3048 mm) of combustible construction.

Exceptions:

1. One- and two-family *dwellings* and *townhouses*.
2. Where buildings, balconies and decks are protected by an *automatic sprinkler system*.

4201 Single lane tunnels, general – CC

CHAPTER 42 SINGLE LANE TUNNELS

SECTION 4201–GENERAL

4201.1 Scope. The provisions of this chapter shall apply to *single lane tunnel* design, operation, maintenance, and commissioning. It shall apply to the configuration of the *means of egress*, fire suppression systems, fire alarm and detection systems, emergency ventilation systems, emergency communication systems, monitoring and control of traffic.

For those aspects of fire protection, life safety, and emergency response that are not specifically prescribed herein, the *fire code official* shall have the authority to impose additional requirements to the construction and operation of *single lane tunnels*.

4201.2 Fire protection report. A fire protection report shall be required.

4201.3 Permits. Construction permits shall be required as set forth in Section 105.6 and shall be obtained by the project contractor and installing contractors according to the discrete tunnel segments demarcated by stations.

Operational permits shall be required as set forth in Section 105.5.

4201.4 Electrical wiring and equipment. Electrical wiring and equipment used in connection with *single lane tunnels* shall be installed in accordance with this chapter and NFPA 70.

4202 Single lane tunnels, definitions – CC

SECTION 4202–DEFINITIONS

4202.1 Definitions. The following definitions are specific to single lane tunnels and are not found in Chapter 2.

AUTOMATED GUIDEWAY TRANSIT (AGT). A transportation system using vehicles without an on-board driver and guided by remote or autonomous means typically using rubber tires.

BACKLAYERING. The reversal of smoke and hot gases counter to the direction of the ventilation airflow.

BLUE LIGHT STATION. An emergency communication station marked by a blue light that is used to communicate with *all operations control centers*.

CRITICAL VELOCITY. The minimum steady-state velocity of the ventilation airflow moving toward the fire within an enclosed *single lane tunnel* that is required to control *backlayering* at the fire site, such that a *tenable environment* is maintained along the path of egress away from the fire.

CROSS PASSAGE. A protected passageway between parallel tunnels constructed for safe egress from a tunnel with compromised tenability to a tunnel in a tenable condition.

LONGITUDINAL VENTILATION. A ventilation approach for normal and/or smoke control modes of operation based on fresh air injected into the tunnel and moving in one direction.

OPERATIONS CONTROL CENTER. (Also known as a *fire command center*) A constantly manned location of reporting and control of the *single lane tunnel* system using operational data collected by sensors and communication input.

OPERATOR. The operator of the *single lane tunnel* system.

PORTAL. Vehicle entry to or exit from a tunnel section.

SINGLE LANE TUNNEL. A system by which certain, *approved* passenger vehicle(s) travel autonomously or with a trained driver in tunnels constructed as single lane drive aisles, where each *approved* passenger vehicle reports to and is under the control of *operations control center(s)*.

STANDPIPE VAULT. A vault used to conceal standpipe hose connections installed below the roadway surface so that the transportation roadway surface is not interrupted.

TENABLE ENVIRONMENT. An environment that can support human life as measured by an ambient temperature of less than 140°F (60°C), visibility of 30 feet, (9.1 m) and a carbon monoxide level of less than 400 ppm.

4203 Single lane tunnels, vehicles – CC

SECTION 4203–VEHICLES

4203.1 Allowable vehicles. All vehicle types shall be subject to an approval process wherein they will be evaluated by the *building official* and the *fire code official*. The maximum battery energy for a vehicle operated in the *single lane tunnel* is 123 kilowatt-hours unless *approved* by the *building official* and the *fire code official*.

4203.2 Autonomous vehicles. Each AGT vehicle, autonomous vehicle, or remote-controlled vehicle and the use thereof shall be reviewed by the Clark County Fire Department, Clark County Fire Prevention and Clark County Building Department and *approved* by the Clark County Manager.

4203.3 Speed control. All vehicles in tunnels shall be operated in accordance with the posted speed limits approved by the *fire code official*. The *operator* shall provide a monthly report to the *fire code official* of all vehicles that exceeded the posted speed limit in the prior month and the actions taken to address any speed violations.

4203.4 Maximum heat release rate. Passenger vehicles that may be conducted through a tunnel shall have a heat release rate of no more than 8 megawatts (MW). Final fire size to be determined based on the performance of the emergency ventilation system.

4203.5 Prohibited fuels. Hydrocarbon based fuels shall be prohibited for passenger transport.

4203.6 Tunnel clear width. The minimum width of a tunnel shall be the width of the largest *approved* vehicle, inclusive of side mirrors and other vehicle projections, plus an unobstructed clear width graduating from 24 inches (610 mm) at the walking surface to 30 inches (762 mm) at 62 inches (1575 mm) above the walking surface to 17 inches (432 mm) at 80 inches (2032 mm) above the walking surface.

4203.7 Additional review. The *building official* and the *fire code official* reserve the right to additional reviews and requirements due to evolving technologies and uses of the *single lane tunnel* systems.

4204 Single lane tunnels, design – CC

SECTION 4204–SINGLE LANE TUNNEL DESIGN

4204.1 Signage.

4204.1.1 Portal access signs. The destination of each tunnel shall be marked at the entrance to each *portal* with a permanent sign with plainly legible letters not less than 6 inches (152 mm) high and principal strokes at least ¾-inch (19 mm) wide.

4204.1.2 Pedestrian, bicycles and motor-driven cycles prohibited. Signage shall be provided at each *portal* entrance stating “Pedestrians, Bicycles, Motor-driven Cycles Prohibited.”

4204.1.3 Tunnel signs. Tunnel signs shall be provided in tunnels at 82-foot (25 m) intervals and shall comply with the requirements of NFPA 130 and the requirements of this section. The signs shall be placed in a consistent location as *approved* by the *fire code official*.

Tunnel signs shall be a minimum of 18 inches (457 mm) wide by 12 inches (305 mm) tall and include the following information:

1. Identifier (tunnel name) and position within the tunnel, minimum 2-inch (51 mm) text.
2. The nearest exit identifier in both directions of travel, minimum 2-inch (51 mm) text.
3. Travel distance to exits, minimum 1-inch (25 mm) text.

4204.1.4 Blue light station signs. *Blue light station* signs shall be provided at each *blue light station* and shall comply with the requirements of NFPA 130 and the requirements of this section.

Blue light station signs shall be a minimum of 18 inches (457 mm) wide and 10 inches (254 mm) tall and include the following information:

1. Name of the tunnel segment, minimum 1 1/2-inch (38 mm) text
2. The nearest exit identifier in both directions of travel, minimum 1 1/2-inch (38 mm) text.
3. Travel distance to exits, minimum 1-inch (25 mm) text.

4204.1.5 Exit signs. Exit signs shall be provided at *exits* and *exit access* doors in accordance with Section 1013 and the *International Building Code*.

Exception: Exit signs shall not be required at *portals* where open to sky.

4204.1.6 Outdoor portal and ramp signs. Outdoor portal signage shall be installed in accordance with the *approved* tunnel identification plan and as required by the *fire code official*.

4204.1.7 Hazardous materials prohibited. Signage indicating the prohibition of *hazardous materials* shall be located at *portals*, stations, and other areas required by the *fire code official*.

4204.2 Means of egress. *Single lane tunnels* shall be provided with an *approved means of egress* system in accordance with this section and Chapter 10.

4204.2.1 Tunnel exit access travel distance. The distance between *exits* within a tunnel shall not exceed 1,250 feet (381 m). For the purposes of this section, *exits* shall be directly to grade or directly open to sky.

Exceptions:

1. The distance between *exits* directly to grade or directly open to sky within a tunnel shall not exceed 1,800 feet (548 m) when *approved* fire department response vehicle(s) are provided in accordance with Section 4211.
2. The distance between *exits* directly to grade or directly open to sky within a tunnel shall not exceed 2,500 feet (762 m) when the following are met:
    - 2.1. *Approved* fire department response vehicle(s) are provided in accordance with Section 4211.
    - 2.2. *Cross passages* in accordance with Section 4204.3 are provided or *areas of refuge* in accordance with Section 4204.4 are provided.

4204.2.2 Escalators. Escalators used as a component of the *means of egress* shall comply with the requirements of NFPA 130.

4204.2.3 Illumination. Illumination shall be provided for *single lane tunnels* at all times and shall produce not less than 1 footcandle (11 lux) at the walking surface under normal and emergency power.

4204.2.4 Illumination under emergency power. *Single lane tunnel* illumination under emergency power shall be provided for a minimum duration of 2 hours or as determined by the rescue scenario.

4204.2.5 Luminous egress path markings. Luminous egress path markings shall be provided for *cross passage*, *area of refuge*, and *exit* doors. Luminous markings shall be in accordance with Section 1025.4, and where applicable, Section 1025.5. Luminous markings shall be installed in accordance with Sections 1025.2.6.1 through 1025.6.2.3.

4204.3 Cross passages. Where *Cross passages* are provided between twin bore tunnels, they shall comply with the requirements of this section.

4204.3.1 Exit access distance. *Cross passages* used as *exits* in accordance with exception #2 of Section 4204.2.1 shall be located within 1250 feet (381 m) from an *exit* directly to grade, directly open to sky, or another *cross passage*.

4204.3.2 Construction. *Cross passages* shall be constructed as smokeproof enclosures separated from tunnels by 2-hour fire-resistance rated construction. Penetrations, joints and voids, opening protectives, and ducts and air transfer openings shall be in accordance with Chapter 7 of the *International Building Code*.

4204.3.3 Clear width. *Cross passages* shall maintain a minimum clear width of 44 inches (1118 mm) from finished floor to a height of 80 inches (2032 mm) above finished floor.

4204.3.4 Doors. *Cross passage* doors shall be 1-1/2-hour smoke doors.

4204.3.4.1 Door sizing. Doors shall be sized to accommodate a wheelchair.

4204.3.4.2 Door hardware. *Cross passage* doors shall be provided with *panic hardware* or *fire exit hardware* with self-closing devices capable of closing while the tunnel emergency ventilation system is operating.

4204.3.5. Pressurization requirements. Each *cross passage* shall be pressurized to maintain a minimum positive pressure of 0.10 inch of water (25 Pa) with respect to adjacent tunnels and occupied spaces while emergency ventilation systems are operating.

4204.3.6 Forces to unlatch and open doors. Each *cross passage* door shall require not more than a 30-pound (133 N) force to be set in motion and shall move to a full-open position when subjected to not more than a 15-pound (67 N) force as measured while emergency ventilation system and pressurization equipment is operating.

4204.3.7 Illumination. Illumination shall be provided throughout each *cross passage* at times the *cross passage* is occupied and shall produce not less than 1 footcandle (11 lux) at the walking surface under normal and emergency power.

4204.3.8 Blue light station. A *blue light station* shall be provided within each *cross passage*.

4204.3.9 Emergency power. Emergency power shall be provided for illumination, pressurization systems, and *blue light stations*.

4204.3.9.1 Duration. *Cross passage* emergency power shall be provided for a duration as determined by the rescue scenario and as required by the *fire code official* but shall not be less than 2 hours.

4204.4 Areas of refuge. Where *areas of refuge* are provided, they shall comply with the requirements of this section.

4204.4.1 Exit access distance. *Areas of refuge* used as *exits* in accordance with exception #2 of Section 4204.2.1 shall be located within 1,250 feet (381 m) from an *exit* directly to grade, directly open to sky, or another *area of refuge*.

4204.4.2 Construction. *Areas of refuge* shall be constructed as smokeproof enclosures separated from tunnels by 2-hour fire-resistance rated construction. Penetrations, joints and voids, opening protectives, and ducts and air transfer openings shall be in accordance with Chapter 7 of the *International Building Code*.

4204.4.3 Size. Each *area of refuge* occupant load shall be determined by the sum of the passengers, including drivers or operators, from two vehicles at maximum capacity. The *area of refuge* shall be not less than 5 square feet (0.46 m^2) per occupant plus an additional wheelchair space area of 30 inches by 52 inches (762 mm by 1321 mm) or 70 square feet (7.53 m^2), whichever is greater, with minimum dimensions of 5 feet by 14 feet (1524 mm by 4267 mm) and a minimum clear height of 80 inches (2032 mm).

Where the required size of an *area of refuge* exceeds 70 square feet (7.53 m^2) and is provided through multiple rooms, each room of the *area of refuge* shall be a minimum of 70 square feet (7.53 m^2) with minimum dimensions of 5 feet by 14 feet (1524 mm by 4267 mm) and a minimum clear height of 80 inches (2032 mm). Each room of an *area of refuge* shall be contiguous with one another. *Approved* openings shall be provided in the contiguous walls to allow free movement between the rooms of an *area of refuge* without the need to leave the *area of refuge*.

Exceptions:

1. Where the ceiling of an *area of refuge* is curved or sloped, the minimum clear height of an *area of refuge* shall be permitted to be reduced by not more than 6 inches (152 mm) over not more than 25% of the required minimum size of the room.
2. For any portion of the *area of refuge* with a clear height of less than 74 inches (1880 mm), the corresponding floor area shall not be counted towards achieving the minimum size or dimension of the room.

4204.4.4 Doors. *Area of refuge* doors shall be 1-1/2-hour smoke doors.

4204.4.4.1 Door sizing. Doors shall be sized to accommodate a wheelchair.

4204.4.4.2 Door hardware. *Area of refuge* doors shall be provided with *panic hardware* or *fire exit hardware* with self-closing devices capable of closing while the tunnel emergency ventilation system is operating.

4204.4.5 Pressurization requirements. Each *area of refuge* shall be pressurized to maintain a minimum positive pressure of 0.15 inch of water (37 Pa) with respect to adjacent tunnels and occupied spaces while emergency ventilation systems are operating.

4204.4.6 Forces to unlatch and open doors. Each *area of refuge* door shall require not more than a 30-pound (133 N) force to be set in motion and shall move to a full-open position when subjected to not more than a 15-pound (67 N) force as measured while emergency ventilation system and pressurization equipment is operating.

4204.4.7 Illumination. Illumination shall be provided in *areas of refuge* and shall produce not less than 1 footcandle (11 lux) at the walking surface and the secondary means of access under normal and emergency power. Illumination shall be controlled from within the *area of refuge*.

4204.4.8 Blue light station. A *blue light station* shall be provided within each *area of refuge*.

4204.4.9 Drainage. Sufficient drainage shall be provided to accommodate *automatic sprinkler system* and standpipe system discharge, as well as any environmental flooding such as rain or ground water seepage.

4204.4.10 Video camera system. Video camera coverage shall be provided *in areas of refuge*. The video camera system shall display at *operations control centers*.

4204.4.11 Secondary means of access. Each *area of refuge* shall be provided with an *approved* independent means of access to grade. Such access shall be sized to a minimum of 48-inch by 48-inch (1219 mm by 1219 mm), and be provided with an *approved* permanently installed fixed ladder designed for the live loads indicated in Section 1607.10 of the *International Building Code*. Final access to grade from the permanently installed fixed ladder shall be by access hatch. Force required to open the access hatch from the interior shall not be excessive and shall be *approved* by the *fire code official*. The access hatch shall be provided with an *approved* means of opening from the exterior at grade. The operation of the access hatch shall be *approved* by the *fire code official*. Clear, unobstructed access shall be provided between the access hatch at grade and the *public way*.

Exceptions:

1. The *fire chief* shall have the authority to require additional design requirements to the permanently installed fixed ladder including requirements in excess of those indicated in Section 1607.10 of *the International Building Code*.
2. An *approved* secondary means access to grade may include access with a minimum 48” in diameter provided the access includes vertical lift equipment approved by the *fire code official*.

4204.4.12 Ventilation. *Areas of refuge* shall be provided with a fresh air ventilation system.

4204.4.13 Occupant equipment. Facilities for hydration, sanitation, medical, and other support equipment shall be provided for *areas of refuge*.

4204.4.14 Signage. Signage shall be provided identifying the *area of refuge* from the tunnel.

4204.4.14.1 Occupant instructions. Signage shall be provided within *areas of refuge* providing emergency instructions to occupants.

4204.4.14.2 Secondary access signage. Access to the secondary means of access shall be identified by signage within the *area of refuge* and at the *public way*.

4204.4.15 Emergency power. Emergency power shall be provided for ventilation, illumination, *blue light station*, drainage, signage, video systems, traffic control, and any other system necessary to the life safety of the occupants within the *area of refuge*.

4204.4.15.1 Duration. *Area of refuge* emergency power shall be provided for a duration as determined by the rescue scenario and as required by the *fire code official* but shall not be less than 4 hours.

4204.4.16 Survivability. Emergency power, ventilation, illumination, *blue light stations*, drainage, *fire alarm systems*, and signage shall be protected for survivability from fire within a tunnel.

4204.4.16.1 Duration. The duration of survivability shall be determined by the rescue scenario and as required by the *fire code official* but shall not be less than 2 hours.

4204.5 Emergency ventilation system.

4204.5.1 General. An emergency ventilation system shall be provided for tunnels, subgrade stations, and other areas required by the *fire code official*.

4204.5.2 Design. The emergency ventilation system design shall be proposed through a separate design brief which shall be reviewed for approval by the *building official*, *fire code official* and an *approved* Nevada registered independent third-party engineer qualified for this area of expertise. Chapter 7 of NFPA 130, Section 909 shall be used as reference documents for system design.

4204.5.3 Ventilation flow rate. An emergency ventilation system shall operate at a *critical velocity* sufficient to prevent *backlayering* due to a design fire based on a rational analysis performed by a *registered design professional* and *approved* by *the fire code official*, but not less than 8 MW. This ventilation rate shall be determined by *longitudinal ventilation* fire modeling prepared by a Nevada Registered Professional Engineer working within this area of expertise.

4204.5.4 Duration of tenability. Tenability shall be established in the designated egress zone within 120 seconds after activation of the ventilation system and be maintained for a minimum duration of 2 hours.

4204.5.5 Ramp up time. The emergency ventilation system fan motors shall be designed to achieve their full operating speed in no more than 30 seconds from a stopped position when started. The allowable ramp up time for variable-speed motors is 60 seconds.

4204.5.6 Ventilation flow reversal. In tunnel segments requiring the ventilation to reverse, flow reversal shall be accomplished within 60 seconds or as required based on system components.

4204.5.7 Automatic emergency ventilation system actuation. The emergency ventilation system shall be activated automatically upon a water flow alarm, or fire alarm from the *fire alarm system*.

4204.5.8 Manual emergency ventilation system actuation. The emergency ventilation system shall be allowed to be activated by manual means from an *operations control center* operator.

4204.5.9 Ventilation sound level. Where the sound level of the ventilation equipment exceeds 110 dB, the *fire code official* shall have the authority to require *approved* visual notification.

4204.5.10 Acceptance testing. Acceptance testing of the emergency ventilation system shall be in accordance with the applicable requirements of Section 909.18 or other test method *approved* by the *building official* and/or *fire code official*.

4204.5.11 Maintenance. The emergency ventilation system shall be maintained in accordance with Section 909.22. An operational permit shall be maintained in accordance with Section 105.5.63.

4204.6 Pressurization systems. Where pressurization is required, pressurization systems shall be designed and installed in accordance with Section 909.

4204.7 Visual indication system. A visual indication system shall be provided at *portals* and in tunnels to indicate the presence of a tunnel alarm condition. The visual indication system shall be *approved* by the *fire code official*.

4204.8 Tunnel driving surface. The tunnel driving surface and roadways leading to tunnels shall be paved with an all-weather surface and shall have a running slope not steeper than 1 unit vertical in 12 units horizontal (8-percent slope) in order to qualify as an *approved means of egress*.

4204.9 Hazardous materials. *Hazardous materials* shall not be located or conveyed within *single lane tunnels*.

4205 Single lane tunnels, fire suppression – CC

SECTION 4205–FIRE SUPPRESSION

4205.1 Water supplies. *Single lane tunnel* water supplies shall be provided in accordance with this section.

4205.1.1. Fire pumps. Fire pumps installed in accordance with NFPA 20 shall be provided as part of the *single lane tunnel* water supply.

4205.1.2 Fire pump service. A single fire pump shall not serve more than 12,500 feet (3810 m) of tunnels.

Exceptions:

1. When *approved* by the *fire code official*, a single fire pump shall not serve more than 12,500 feet (3810 m) of twin-bore tunnels.
2. When *approved* by the *fire code official*, where a second fire pump is provided to serve the same areas as the first fire pump, the distance of tunnels served shall not be limited to 12,500 feet (3810 m).

4205.1.3 Fire department connections. Fire department connections shall be installed in accordance with Section 912.

4205.1.3.1 Locations. Fire department connections shall be located such that each standpipe system, or portion thereof, is dual fed. The first fire department connection shall be provided near each fire pump. Additional fire department connection(s) shall be provided at location(s) *approved* by the *fire code official*.

4205.2 Standpipe systems.

4205.2.1 General. An automatic standpipe system shall be provided for *single lane tunnels*.

4205.2.2 Installation standard. Standpipe systems shall be installed in accordance with this section, Section 905, and NFPA 14.

4205.2.3 Locations of class 1 standpipe hose connections. Class 1 standpipe hose connections shall be provided in all of the following locations:

1. In every *area of refuge*.
2. In every *cross passage* within 5 feet (1524 mm) of each *cross passage* door leading to a tunnel.
3. In enclosed passageways.
4. At each *portal* location.
5. In every subgrade station providing hose connection coverage in accordance with Section 905.4.
6. In transition shafts and similar areas.
7. In tunnel *standpipe vaults* spaced not greater than 160 feet (48.8 m) apart.

4205.2.4 Tunnel standpipe vaults. Tunnel hose connections shall be provided within a *standpipe vault*. The *standpipe vault* cover shall be flush with the travel surface. The *standpipe vault* cover shall be provided with a blue reflective marker. The design of the *standpipe vault* shall be *approved* by the *fire code official*.

4205.2.4.1 Drainage. Sufficient drainage shall be provided to accommodate the automatic standpipe system discharge and any environmental flooding such as rain or ground water seepage.

4205.2.4.2 Clearance. Hose connection clearances within a *standpipe vault* shall comply with NFPA 14.

4205.2.5 Isolation valves. Isolation valves shall be provided in tunnel standpipes between every 5 hose connections or at spacing not exceeding 800 feet (244 m) whichever distance is shorter.

4205.2.6 Tunnel standpipe design flow. Tunnel standpipe systems shall be hydraulically designed to provide a minimum flow rate of 500 gpm (1900 L/min), 250 gpm (950 L/min) through each of the two hydraulically most remote *standpipe vaults*.

4205.2.6.1 Tunnel standpipe design pressure. The flow rates required by Section 4205.2.6 shall be provided at a minimum residual pressure of 125 psi (8.6 bar).

4205.3 Automatic sprinkler systems.

4205.3.1 Subgrade stations. An *automatic sprinkler system* installed in accordance with NFPA 13 with a minimum design of ordinary hazard group 2 shall be provided for each subgrade station.

4205.3.2 Other areas. An *automatic sprinkler system* installed in accordance with NFPA 13 with a minimum design of ordinary hazard group 1 shall be provided for portal connection spaces and other non-tunnel subsurface areas.

Exception: *Areas of refuge, cross passages*, and dedicated egress shafts.

Storage and vehicle charging shall be prohibited in portal connection spaces and other non-tunnel subsurface areas.

4206 Single lane tunnels, fire alarm and detection systems – CC

SECTION 4206–FIRE ALARM AND DETECTION SYSTEMS

4206.1 General. A *fire alarm system* shall be provided for *single lane tunnels*.

4206.1.1 Voice evacuation system. An emergency voice/alarm communications system shall be provided for each enclosed station.

4206.2 Installation standard. *Fire alarm systems* shall be installed in accordance with this section, Section 907, NFPA 72, and NFPA 130.

4206.3 Fire alarm control units. In addition to other fire alarm control units, a fire alarm control unit shall be provided in each *operations control center*.

4206.4 Multi-sensor detection system. An *automatic* fire detection system consisting of multi-sensor detectors providing area detection for smoke, heat, and carbon monoxide shall be provided throughout the following areas:

1. *Areas of refuge*.
2. *Cross passages*.
3. Portal connection spaces.
4. Tunnels.
5. Other areas required by the *fire code official*.

4206.4.1 Detector spacing. Detector spacing in areas other than tunnels shall be in accordance with NFPA 72.

4206.4.2 Tunnel detector spacing. Detector spacing in tunnels shall be in accordance with NFPA 130.

4206.5 Fiber optic linear heat detection system. All tunnels, and similar areas, shall be provided with an *approved* fiber optic linear heat detection system.

4206.6 Valve supervision. Supervision of *automatic sprinkler system* and standpipe system valves shall be in accordance with Sections 903.4.1 and 905.9.

4206.7 Occupant notification. Occupant notification shall be provided in accordance with this section.

4206.7.1 Audible alarms. Audible alarm notification appliances shall be provided throughout *single lane tunnels* to achieve the sound pressure level requirements set forth by Sections 907.5.2.1.1 & 907.5.2.1.2.

Exception: Tunnels, portal connection spaces, *areas of refuge*, *cross passages*, *stairways*, areas dedicated solely to occupant egress.

4206.7.2 Visible alarms. Visible alarm notification appliances shall be provided throughout *single lane tunnels* as set forth by Section 907.5.2.3.

Exceptions:

1. Tunnels shall be provided with visible notification appliances spaced not greater than 330 feet (100 m) apart.
2. Portal connection spaces.
3. *Stairways*, *areas of refuge*, *cross passages*, and areas dedicated solely to occupant egress.

4206.8 Signal disposition. *Fire alarm system* signals shall be transmitted as follows:

4206.8.1. All *fire alarm system* signals shall be transmitted to each *operations control center*.

4206.8.2. Where a station, single lane tunnel or portion of either are connected to another *facility*, signals necessary to initiate any required responses shall be transmitted to the connected *facility* by an *approved* means.

4206.9 Fire safety functions.

4206.9.1. In addition to other requirements contained throughout this code and NFPA 72, water flow alarm, fire alarm, and carbon monoxide alarm signals shall initiate the following:

1. Occupant notification in accordance with the *approved fire alarm system* input-output matrix.
2. Emergency ventilation system in accordance with the *approved fire alarm system* input-output matrix.
3. *Area of refuge* and *cross passage* pressurization systems in accordance with the *approved fire alarm system* input-output matrix.
4. Vehicle evacuation in accordance with Section 4206.9.2 and the *approved fire alarm system* input-output matrix.
5. Tunnel visual indication system in accordance with Section 4204.7.

4206.9.2 Vehicle evacuation. Upon receipt of a water flow alarm, fire alarm, or carbon monoxide alarm at an *operations control center*, operators shall immediately perform the actions required by the vehicle evacuation plan.

4207 Single lane tunnels, operations control center – CC

SECTION 4207–OPERATIONS CONTROL CENTER

4207.1 Where required. An *operations control center* shall be provided for *single lane tunnels* and shall be subject to the approval of the *fire code official*.

4207.2 Redundant operations control centers. A redundant *operations control center* shall be provided and shall be subject to the approval of the *fire code official*.

4207.3 Required features. Each *operations control center* shall contain the features required by NFPA 130 Chapters 9 and 10 and the following:

1. *Approved* fire alarm control unit in accordance with Section 4206.3 with full annunciation capabilities.
2. *Approved* panel containing status indicators and controls for the emergency ventilation system(s).
3. *Approved* panel containing status indicators for the water supply and fire pump system(s).

   Exception: When *approved* by the *fire code official*, a combined graphics panel shall be acceptable containing status indicators and controls for the emergency ventilation system(s) and status indicators for the water supply and fire pump system(s).
4. Status indicators for emergency and standby power systems.
5. Controls for unlocking locked *exit* doors in the tunnel transportation system.
6. Status indicators and controls for air distribution systems, if applicable.

7. A means for viewing full size plans shall be provided in accordance with one of the following:
    7.1. A new worktable with a minimum size of 3 feet by 7 feet (914 mm by 2134 mm) capable of holding plans in an open position.
    7.2. A method *approved* by the *fire code official*.
8. A means for viewing and recording all fire alarm, supervisory, and trouble signals shall be provided in accordance with one of the following, and shall be connected to a UPS battery system and/or an emergency power supply:
    8.1. A printer connected to the fire alarm control panel.
    8.2. A method *approved* by the *fire code official*.
9. An *approved* whiteboard with a minimum size of 3 feet by 4 feet (914 mm by 1219 mm) capable of easy erasure with a marking device and an eraser attached.

4207.4 Proprietary monitoring. Each *operations control center* shall meet the requirements of a proprietary supervising station facility in accordance with Appendix P.

4207.5 Vehicle evacuation plan. A vehicle evacuation plan shall be prepared and maintained for *single lane tunnels*. Vehicle evacuation plans shall be *approved* by the *fire code official*.

4208 Single lane tunnels, emergency power – CC

SECTION 4208–EMERGENCY POWER

4208.1 Emergency power. Emergency power shall be provided for the features given in Section 4208.3 below. It shall be provided by permanent installations including *approved* separate electrical feeds from the electric utility or an emergency power installation in accordance with NFPA 110.

4208.2 Fuel-fired equipment. Fuel-fired equipment meeting the requirements of Section 4208 shall not be provided in areas of the *single lane tunnel* that are below grade.

4208.3 Required system connections. The following systems shall be connected to the emergency power systems:

1. All systems necessary to the life safety of the occupants within *areas of refuge*.
2. *Blue light stations*.
3. Closed-circuit television / video.
4. Egress illumination.
5. Emergency communication.
6. Exit signs.
7. Firefighting equipment, i.e. fire pumps
8. *Fire alarm systems*.
9. *Operations control center*.
10. Smoke control / smoke removal systems.
11. Tunnel closure and traffic control.

4209 Single lane tunnels, communications systems – CC

SECTION 4209–COMMUNICATION SYSTEMS

4209.1 Emergency responder communication enhancement systems (ERCES). *Single lane tunnels* shall be provided with an *approved* emergency responder communication enhancement system in accordance with Section 510.

4209.2 Blue light stations. *Approved blue light stations* shall be provided at the following locations:

1. *Areas of refuge*.
2. *Cross passages*.
3. At each subgrade exit stairway located at the bottom of the stairway.
4. *Approved* locations in subgrade stations.
5. In tunnels located at the halfway point between exits in accordance with Section 4204.2.1, *cross passages*, or *areas of refuge*.

4209.2.1 Installation standard. *Blue light stations* shall be installed in accordance with the requirements for Two-Way Emergency Communications Systems for Rescue Assistance, per NFPA 72.

4210 Single lane tunnels, construction period requirements – CC

SECTION 4210–CONSTRUCTION PERIOD REQUIREMENTS

4210.1 Scope. This section shall apply to *single lane tunnels* in the course of construction, *alteration* or demolition, including those in underground locations. Compliance with NFPA 241 is required for items not specifically addressed herein.

4210.2 Purpose. This section prescribes minimum safeguards for construction, *alteration* and demolition operations to provide reasonable safety to life and property from fire during such operations.

4210.3 Construction access plan. A construction access plan (site map) shall be filed with the Clark County Fire Department. The plan shall show the major features for Clark County Fire Department response including:

1. Fire apparatus access points.
2. Temporary fire department connections including signage.
3. Temporary standpipe hose connections with signage.
4. Mining control center (TBM operational office).
5. Fire hydrants.
6. Electric power sources and disconnects.
7. Overhead power lines.
8. Fuel storage.
9. *Hazardous material* storage.
10. Method of tracking individuals underground (commonly known as a “brass board”).

The plan shall be reviewed and/or modified as required by the *fire code official*.

4210.4 Vertical access. Vertical access elements including, but not limited to, stairs, scaffolding and ramps and the like shall be reviewed by the Clark County Fire Department and modified if found to be unacceptable for fire and rescue operations.

4210.5 Temporary standpipes. Temporary class I standpipe hose connections supplied from a fire department connection shall be provided. The fire department connection shall be within 100 feet (30 480 mm) of an active private or public fire hydrant. The standpipe system shall be a minimum of 2-1/2-inch (DN 65) pipe that may also be a construction water service line.

4210.6 Communication systems. The construction site, including the tunnel bore shall have Wi-Fi or LTE capability that allows the fire department to communicate via fire department radios.

4210.7 Training and drills. Public safety shall have access to the construction site and tunnels for training and drills at various stages of construction at mutually agreed times with at least one week advance notice. The *operator* shall notify the appropriate public safety agencies of safety critical events i.e. boring machine cutter head interventions within 24 hours of the scheduled event

4210.8 Notification of hazardous events. The Clark County Fire Department shall be notified of hazardous events within 24 hours of their occurrence. These include, but are not limited to:

1. Cutter head interventions.
2. Flooding.
3. Flammable liquids release, handling or incidents.
4. Environments immediately dangerous to life or health.
5. Events or environments likely to require emergency response; especially technical rescue.

4210.9 Additional safety measures. Additional safety measures shall be provided where required by the *fire code official*.

4211 Single lane tunnels, fire department response vehicles – CC

SECTION 4211–FIRE DEPARTMENT RESPONSE VEHICLES

4211.1 Response vehicles. Where required by Section 4204.2.1 *approved* fire department response vehicles shall be provided at the sole cost and expense of the *operator* to be used exclusively for fire department use, which includes any costs related incurred by the Clark County Fire Department related to use of the vehicle, including, but not limited to, charging station, if necessary.

4211.2 Vehicle specifications. The *fire chief* shall have the authority to specify all aspects and functions of a fire department response vehicle. Once a response vehicle is *approved* by the *fire chief*, the response vehicle specifications cannot be revised without the *approval* of the *operator*.

4211.3 Vehicle access and storage. The Clark County Fire Department shall have access to any fire department response vehicle including for non-emergencies and shall be responsible for the storage of the response vehicles.

4211.4 Vehicle maintenance. All fire department response vehicles shall be maintained by the *operator* to the satisfaction of the *fire chief*. The cost of maintenance and repair including replacement, if necessary of fire department response vehicles shall be borne by the *operator*, so long as the damage caused was a result of CCFD efforts related to the tunnel transportation system.

4211.5 Number of Response Vehicles. Where required by Section 4204.2.1 the *operator* shall provide one response vehicle for each tunnel segment that exceeds 1,250 feet (381 m) without an *exit* directly at grade or directly open to the sky plus one spare response vehicle.

5003.2.2.1 Design and construction – SN

5003.2.2.1 Design and construction. Piping, tubing, valves, fittings and related components used for hazardous materials shall be in accordance with the following:

1. Piping, tubing, valves, fittings and related components shall be designed and fabricated from materials that are compatible with the material to be contained and shall be of adequate strength and durability to withstand the pressure, structural and seismic stress and exposure to which they are subject.
2. Piping and tubing shall be identified in accordance with ASME A13.1 to indicate the material conveyed.

3. Manual valves or automatic remotely activated fail-safe emergency shutoff valves shall be installed on supply piping and tubing and provided with *ready access* at the following locations:
    3.1. The point of use.
    3.2. The tank, cylinder or bulk source.
4. Manual emergency shutoff valves and controls for remotely activated emergency shutoff valves shall be clearly visible, provided with ready access and identified in an *approved* manner.
5. Backflow prevention or check valves shall be provided where the backflow of hazardous materials could create a hazardous condition or cause the unauthorized discharge of hazardous materials.

    Exceptions:

    1. Piping for inlet connections designed to prevent backflow.
    2. Piping for pressure relief devices.
6. New and existing remote tank filling connections shall be in accordance with the following:
    6.1. Permanent signs clearly indicating the tank contents associated with each connection port shall be displayed at the remote filling station. Signage shall be in English as a primary language or in symbols allowed by this code, shall be durable, and the size, color and lettering shall be *approved*.
    6.2. The transfer hose connection for liquids that have a pH of 6.0 or less (acidic) shall be equipped with female “Cam-lock” type fittings or other mechanical connection means *approved* by the *fire code official*, sized appropriately.
    6.3. The transfer hose connection for liquids that have a pH of 8.0 or greater (basic) shall be equipped with male “Cam-lock” type fittings or other mechanical connection means *approved* by the *fire code official*, sized appropriately.

5003.11 Group M storage and display and group S storage – SN

5003.11 Group M storage and display and group S storage. For one-story buildings and for multistory mixed-occupancy buildings not containing occupancy groups A, E, I, or R, the aggregate quantity of hazardous materials stored and displayed within a single *control area* of a Group M occupancy, or an outdoor *control area*, or stored in a single *control area* of a Group S occupancy, is allowed to exceed the *maximum allowable quantity per control area* indicated in Section 5003.1 where in accordance with Sections 5003.11.1 through 5003.11.2.

5006 Radioactive Materials – CC

Section 5006–Radioactive Materials

5006.1 General. Use and handling of permittable quantities of *radioactive materials* shall be in accordance with this chapter.

5006.2 Permit trigger amounts. To store or handle at any installation any amount of *radioactive materials* for which a specific license from the Nuclear Regulatory Commission and/or Nevada Division of Public and Behavioral Health Radiation Control Program.

5006.3 Permit submittals. Permit submittals shall include the items listed in Section 5006.3.1 through 5006.3.3.

5006.3.1 Location. A plan view of building showing location(s) of permittable quantities of *radioactive materials*, storage methods, signage, and safety protocols.

5006.3.2 Quantity and type. Total quantities of *radioactive materials*, reported in Curies, with the type of emitter (alpha, beta, gamma, neutron) identified.

5006.3.3 Certifications. A copy of the facility's Nuclear Regulatory Commission License and a copy of the facility's Nevada Division of Public and Behavioral Health Radiation Control Program License.

5305.11 Temporary indoor carbon dioxide fog effects – SN

5305.11 Temporary indoor carbon dioxide fog effects. Maximum Allowable Quantity of Carbon Dioxide (CO_2) shall be calculated as follows:

1. Calculate Stage Volume: Build an imaginary 'box' over stage that is 10' high and calculate the volume of the 'box'.
2. Calculate Allowable Cubic feet of CO_2 within 'box': OSHA allowable short-term exposure limit for CO_2 is 30,000 ppm or 3 %.
3. Convert volume of CO_2 to pounds by dividing by 8.74 ft3/lbs CO_2.
4. If the desired amount of CO_2 is less than the allowable calculated amount, then the desired quantity is acceptable.
5. If more CO_2 is desired, calculate air change rate of venue and determine number of air changes per show.
6. Calculate Venue Air Change Rate: Air change rate = venue volume / exhaust rate.
7. Calculate number of Air Changes: Show length / air change rate.
8. Calculate the Total Allowable CO_2: Step 3 above, then multiply by the number of air changes.

5305.12 Permanent indoor fog effects – CC

5305.12 Permanent indoor fog effects. Each compressed gas supply serving permanent indoor fog effects shall be provided with an excess flow control valve.

5306.6 Medical gas system plan submittal – SN

5306.6 Medical gas system plan submittal. Plans and specifications shall be submitted for review and approval. Following approval of the plans, a copy of the *approved* plans and permit shall be maintained on the premises in an *approved* location. As required by the *fire code official*, the plans shall include the following:

1. Project name, street address and owner's name.
2. Contractor name, address, phone number, license numbers (City, State Contractor and State Fire Marshal).
3. Signature of the licensee (contractors Master or Qualified Employee) or seal and signature of a Professional Engineer licensed in the state of Nevada.
4. Code edition of standards used in the design.
5. System classification.
6. When used - gas type, container size and quantity.
7. Symbol legend with equipment description (manufacture's name and model number) and mounting description (surface, semi-flush, flush, and exterior).
8. Site plan.
9. Floor plan drawn to an indicated scale (1/8" minimum) on sheets of a uniform size showing:
    - 9.1. Point of compass (north arrow).

9.2. Walls, doors, windows, openings, stairs, elevators, passageways, high-piled storage racks, etc., as applicable to depict the facility.

9.3. Room use identification labels.

9.4. Gas, air and vacuum piping distribution systems, manifolds, sizes and material types. Piping hangers and slopes.

9.5. Valves and valve boxes, outlets, gages and other components.

9.6. Electrical warning systems (local and master alarm panels), conductor/conduit routing and size, power panel and circuit connection.

9.7. Key plan.

9.8. Compressor inlet location and vacuum exhaust outlet location.

9.9. For interior gas supply rooms provide construction fire ratings, ventilation and fire sprinkler information.

10. Product data submittal including a cover index sheet listing products used by make and model number, manufacturer data sheets (highlighted or marked) and listing information for all equipment, devices, and materials.
11. Design number and detail of penetration fire stop system when required.
12. Verification & inspection requirements.
13. Name of independent medical gas testing agency to certify the system.
14. Any additional information determined necessary.

5306.7 Medical gas systems testing – SN

5306.7 Medical gas systems testing. Hyperbaric systems and medical gas systems required by NFPA 99 to be verified by a person other than the installing contractor shall be certified by an independent medical gas testing agency prior to use of the system. The independent medical gas inspector shall hold a current NITC certification and Nevada State Fire Marshal certification as a medical gas installer. The *fire code official* may witness any or all testing. Copies of the system certification shall be provided to the *fire code official*.

5307.3.2 Gas detection system – SN

5307.3.2 Gas detection system. Where ventilation is not provided in accordance with Section 5307.3.1, a *gas detection system* complying with Section 916 shall be provided in rooms or indoor areas and in below-grade outdoor locations with insulated carbon dioxide systems. Carbon dioxide sensors shall be provided within 12 inches (305 mm) of the floor in the area where the gas is expected to accumulate or other *approved* locations. The system shall be designed as follows:

1. Activates an audible and visible supervisory alarm at a normally attended location upon detection of a carbon dioxide concentration of 5,000 ppm (9000 mg/m3).
2. Activates an audible and visible alarm within the room or immediate area where the system is installed and stops the flow of carbon dioxide into the piping system upon detection of a carbon dioxide concentration of 30,000 ppm (54 000 mg/m3).

5601.1.3 Fireworks – SN/CC

5601.1.3 Fireworks. The possession, manufacture, storage, sale, handling, and use of fireworks are prohibited.

Exceptions:

1. Storage and handling of fireworks as allowed in Section 5604.
2. Manufacturer, assembly and testing of fireworks as allowed in Section 5605.
3. The use of fireworks for fireworks displays as allowed in Section 5608.
4. The possession, storage, sale, handling and use of specific types of Division 1.4G fireworks where allowed by applicable laws, ordinances and regulations, provided that such fireworks and facilities comply with the 2006 edition of NFPA 1124, CPSC 16 CFR Parts 1500 and 1507, and DOTn 49 CFR Parts 100-185, as applicable for consumer fireworks.
5. The possession, storage, use, handling, and sale of consumer safe and sane fireworks in accordance with the current *Clark County Fire Department Guideline for Fireworks*.

5601.2.2 Sale and retail display – SN/CC

5601.2.2 Sale and retail display. All sales and retail displays of fireworks, *explosives*, or *explosive materials* are prohibited.

Exception: Consumer fireworks 1.4G (*approved* safe and sane) offered for sale at portable retail fireworks stands that are in accordance with the current *Clark County Fire Department Guideline for Fireworks*.

5601.2.4 Financial responsibility – SN

5601.2.4 Financial responsibility. Before a permit is issued, as required by Section 5601.2, the applicant shall file with the jurisdiction a valid certificate of insurance complying with Section 105.1.7, for the purpose of the payment of all damages to persons or property that arise from, or are caused by, the conduct of any act authorized by the permit upon which any judicial judgment results. The *fire code official* is authorized to specify a greater amount when, in his or her opinion, conditions at the location of use indicate a greater amount is required.

5601.2.4.1 Blasting. Before approval to do blasting is issued, the applicant for approval shall submit a certificate of insurance as specified in Chapter 1 in such form, amount and coverage as determined by the legal department of the jurisdiction to be adequate in each case to indemnify the jurisdiction against any and all damages arising from permitted blasting.

5601.2.4.2 Fireworks display. The permit holder shall furnish certificate of insurance as specified in Chapter 1 for the payment of all potential damages to a person or persons or to property by reason of the permitted display, and arising from any acts of the permit holder, the agent, employees or subcontractors.

5601.5 Supervision – SN

5601.5 Supervision. The *fire code official* is authorized to require operations permitted under the provisions of Section 5601.2 to be supervised at any time by the *fire code official* in order to determine compliance with all safety and fire regulations. *Fire code official(s)* or *approved* designee(s) shall be required for all productions where pyrotechnic special effects are used.

Exception: Where the pyrotechnic special effects are used in an *approved* set show that is repeated continuously without change, the *fire code official* may waive the requirement for attendance to all productions, provided the *fire code official* has successfully witnessed product demonstration and at least one performance.

5603.8 Shot reports – SN

5603.8 Shot reports. Shot reports shall be maintained for every blast. These reports shall be available to the *fire code official* upon request within 48 hours. The report shall at a minimum contain the following information:

1. Date and time of the blast.
2. Company name and contact information.
3. Location of the blast.
4. Weather conditions including temperature and wind speed.
5. Quantity and description of all materials used.
6. A list of any un-spent or misfired products.
7. A list of all personnel present.
8. The license type and card number of the blaster.
9. The signature of the blaster or shooter in charge.
10. For blasting operations, the report shall include the seismic data.

5604.1 General – SN

5604.1 General. Storage of *explosives* and *explosive materials*, small arms ammunition, small arms primers, propellant-actuated cartridges, and smokeless propellants in magazines shall comply with the provisions of this section. *Explosive materials* shall be stored only in areas with appropriate zoning and use permits as required by the planning or zoning authority and shall be subject to the approval of the *fire code official*.

5604.6.5.2 Placards – SN

5604.6.5.2 Placards. Type 5 magazines containing Division 1.5 blasting agents shall be prominently placarded during storage and as required during transportation by DOTn 49 CFR Part 172 and DOTy 27 CFR Part 555. All other magazines shall be labeled with the hazard classification only.

5604.7.1 Security – SN

5604.7.1 Security. Magazines shall be kept locked in the manner prescribed in NFPA 495 at all times except during placement or removal of *explosives* or inspection. In addition to the locking requirements, the following security measures shall be required at all *explosives* storage locations

1. The entire magazine site shall be fenced. The fence shall be a minimum of 8 feet (2438 mm) in height and constructed of non-combustible materials.

   Exception: Indoor storage locations shall be secured in a manner consistent with NFPA 495.

2. All *explosives* magazines and storage sites shall submit a security and site access control plan to the *fire code official*.

5604.7.1.1 Security and site access control plan. Security and site access control plans shall include at a minimum:

1. **Site management.** The plan shall include details of how access to the site is restricted, tracked, and monitored.

2. **Security.** The plan shall include details on the method of site security. Security alarm system, video or motion activated cameras, manned security guards, or other *approved* method.
3. **Record keeping.** The plan shall include the procedures for how the inventory of explosives materials and blasting agents are tracked and maintained.
4. **Emergency contact.** A primary and secondary emergency contact person and phone number shall be provided.

5605.1 General – SN

5605.1 General. The manufacture, assembly and testing of *explosives*, ammunition, blasting agents and fireworks is prohibited.

Exceptions:

1. The hand loading of small arms ammunition prepared for personal use and not offered for resale.
2. The mixing and loading of blasting agents at basting sites in accordance with NFPA 495.
3. The use of binary *explosives* or plosophoric materials in blasting or pyrotechnic special effects applications in accordance with NFPA 495 or NFPA 1126.
4. Subject to approval of the *fire code official* and obtaining proper approvals from the planning and zoning authority.

5607.3 Blasting – SN

5607.3 Blasting. Where blasting is done in close proximity to a structure, railway or highway, development, quarry, or any other installation, precautions shall be taken to minimize earth vibrations and air blast effects. Blasting mats or other protective means shall be used to prevent fragments from being thrown.

5607.3.1 Blasting activities. The blasting contractor shall comply with the following requirements in connection with all blasting activities:

1. All blasts shall be monitored at the nearest structure by a third-party engineering firm. Utilities or other critical infrastructure within 300 feet (91 440 mm) of the blast area shall be monitored by a third-party engineering firm. Such monitoring shall be done by a seismologist using a certified, annually calibrated, seismic monitor that shall be capable of measuring blast-induced vibration and blast-induced sound levels.
2. A minimum of two seismographs shall be used to obtain data from each blast or as required by the *fire code official*.
3. The maximum ground-borne vibrations shall not exceed a single component peak particle velocity (vector sum) of 0.5 inches per second (12.7 mm/s) at the nearest structure.
4. For utilities and other critical infrastructure within 300 feet (91 440 mm) of the blast-area, the maximum ground-borne vibrations shall not exceed the limits as set forth by the specific utility purveyors or critical infrastructures engineering department. A written approval from the utility purveyor or critical infrastructure detailing these limits shall be provided to the *fire code official* prior to any blasting activities.

   Exception: If the utility or critical infrastructure purveyor does not provide written approval within a reasonable period of time, as determined by the *fire code official*, the applicant may request permission to submit a blast plan designed so that the maximum ground-borne vibrations shall not exceed a single component peak particle velocity (vector sum) of 0.5 inches per second (12.7 mm/s) at the nearest utility or other critical infrastructure.

5. The maximum air blast shall not exceed 120 dB at the nearest structure.
6. Monitoring results shall be reported to the *fire code official* within 48 hours via e-mail.
7. The blasting contractor shall provide a minimum of 72 hours prior written notice of blasting activities and project duration to all residences, property owners, businesses, and public uses within 2500 feet (762 m) of the blasting area. The manner, form, and content of any such notice shall be subject to the approval of the *fire code official*.
8. For utility notification, see Section 5607.5.
9. The blasting contractor shall notify the *fire code official* and fire department dispatch by telephone a minimum of two hours prior to each blast, and immediately following each blast.
10. The blasting contractor shall provide for pre-blast and post-blast surveys of all structures, utilities, and other critical infrastructures within 300 feet (91 440 mm) of the blast area, or when otherwise required by condition of the *fire code official*. These surveys must be completed by a third-party engineering firm at no cost to the *owner*.
11. A traffic and access control plan shall be provided when blasting activities are conducted within 100 feet (30 480 mm) of any public roadway, or when required by the *fire code official*. The plan shall include warning signage, flagging, temporary road closure, and detour routes. This plan may be subject to the approval of the local law enforcement agency.
12. The blasting contractor shall be responsible for removing and cleaning up any debris from the blast site and adjacent properties.

Exception: These requirements may be modified by the *fire code official*.

5607.3.2 Permit Requirements. A permit is required for the storage and or use of *explosives*, and for any proposed excavation or development activity that will involve blasting. The permit must be obtained by the blasting contractor prior to the beginning of any drilling or blasting activities. The application shall be made to the fire department in such a form and detail as described by the *fire code official*. Applications for permits shall be accompanied by plans detailing the proposed blasting activities as required by the *fire code official*.

5607.4 Restricted hours – SN

5607.4 Restricted hours. Blasting operations shall be limited to the hours of 8:00am to 4:00pm, Monday through Friday, excluding state-recognized holidays unless otherwise *approved* by the *fire code official*.

5607.5 Utility notification – SN

5607.5 Utility notification. The blasting contractor shall contact “Call Before You Dig” to obtain a utility notification dig-ticket number a minimum of 48 hours prior to commencing any drilling or blasting activities. A copy of the dig ticket shall be provided to the *fire code official* upon request.

Exception: In an emergency situation, the time limit shall not apply where *approved*.

5607.6 Electric or electronic detonator precautions – SN

5607.6 Electric or electronic detonator precautions. Precautions shall be taken to prevent accidental discharge of electric or electronic detonators from currents induced by radar and radio transmitters, lightning, adjacent power lines, dust and snowstorms, or other sources of extraneous electricity.

5607.13 Pre-blast procedures – SN

5607.13 Pre-blast procedures. A blast shall not be fired until:The blaster has made certain that all surplus *explosive materials* are in a safe place and in accordance with Section 5607.10 and;

1. All construction workers and equipment are at a safe distance and;
2. Seismic monitor(s) are set up and;
3. All access to the blast site has been shut down and secured and;
4. Communication has been set up between the blaster in charge and those persons securing the blast site and;
5. That adequate warning signals have been given.

5607.13.1 Warning signals – SN

5607.13.1 Warning signals. Warning signals shall be given to alert construction workers on or near a blast site that a blast is going to occur.

1. A warning signal shall be given five minutes prior to the blast and;
2. A warning signal shall be given one minute prior to the blast and;
3. A warning signal shall be given following the blast in accordance with Section 5607.14(4).

5607.14 Post-blast procedures – SN

5607.14 Post-blast procedures. After the blast, the following procedures shall be observed.

1. Persons shall not return to the blast area until allowed to do so by the blaster in charge.
2. The blaster shall allow sufficient time for smoke and fumes to dissipate and for dust to settle before returning to or approaching the blast area.
3. The blaster shall inspect the entire blast site for misfires before allowing other personnel to return to the blast area.
4. The blaster shall sound an all-clear warning signal in accordance with Section 5607.13.1.

5608.1 General – SN

5608.1 General. Outdoor fireworks displays, use of pyrotechnics before a *proximate audience* and pyrotechnic special effects in motion picture, television, theatrical and group entertainment productions shall comply with the *fire code official's* guidelines, Sections 5608.2 through 5608.10 and NFPA 160, NFPA 1123, or NFPA 1126.

5608.2.1 Outdoor fireworks displays – CC

5608.2.1 Outdoor fireworks displays. In addition to the requirements for fire watch personnel, public safety plans, crowd managers, and other requirements of Section 403, permit applications for outdoor fireworks displays using Division 1.3G fireworks shall include a diagram of the location at which the fireworks display will be conducted, including the site from which fireworks will be discharged; the location of buildings, highways, overhead obstructions and utilities; and the lines behind which the audience will be restrained. Displays fired on rooftops shall comply with Chapter 7 of NFPA 1123 and *Clark County Fire Prevention Guideline for Fire Safety and Risk Analysis Requirements for Rooftop Fireworks Displays*.

5608.3.1 Weather conditions – CC

5608.3.1 Weather conditions. Weather conditions including, but not limited to, excessive wind speed shall constitute the basis for canceling the display. The wind measurement locations shall not be shielded by shelters, parapets, roof features, etc.

5608.3.2 Wind speeds – CC

5608.3.2 Wind speeds. At the discretion of the *fire code official*, a ground-launched fireworks display may be canceled when wind is blowing in excess of fifteen miles per hour (6.7 m/s). Rooftop-launched fireworks display may be canceled when the wind exceeds ten miles per hour (4.5 m/s) if, in the opinion of the *fire code official*, an aerial display might be hazardous to property or endanger any person. Wind speed shall be measured from the fireworks display site.

5608.4 Clearance – CC

5608.4 Clearance. Spectators, spectator parking areas, dwellings, buildings, *membrane structures*, cabanas, *tents* or structures shall not be located within the display site or fallout area.

Exceptions:

1. This provision shall not apply to pyrotechnic special effects and fireworks displays using Division 1.4G materials before a *proximate audience* in accordance with NFPA 1126.
2. This provision shall not apply to unoccupied *dwellings*, buildings and structures with the approval of the building *owner* and the *fire code official*.

5608.4.1 Fallout areas – CC

5608.4.1 Fallout areas. Fallout areas shall be in accordance with NFPA 1123.

5608.4.2 Ground pieces – CC

5608.4.2 Ground pieces. Ground pieces shall be located not less than 150 feet (45 720 mm) from spectators, vehicles, *tents*, canopies or *membrane structures*.

5608.4.3 Spectator safety – CC

5608.4.3 Spectator safety. Pyrotechnic special effects shall not be permitted to be shot over the heads of spectators, over egress aisles or exit pathways due to the potential for hazardous debris and fallout caused by those devices. This restriction will apply to devices such as: airbursts, gerbs, comets, mines, line rockets, and any other similar types of effects that utilize a pyrotechnic charge.

Exception: Where *approved* by the *fire code official*, special consideration may be provided with adequate ceiling heights and testing of specific devices in specific locations.

5608.11 Seizure of fireworks – CC

5608.11 Seizure of fireworks. It shall be unlawful to possess, use, explode, offer, display for sale, hold or store any and all fireworks in violation of this section. Upon finding unlawful fireworks, the *fire chief*, *fire code official*, or police chief or their representative shall seize, take, remove or cause to be removed such unlawful fireworks and destroy said unlawful fireworks at the expense of the owner.

5608.12 Penalty for violation – CC

5608.12 Penalty for violation. Any person operating or maintaining any occupancy, premises or vehicle subject to this regulation who shall permit any hazard to exist on premises under his control or who shall fail to take immediate action to abate a hazard when ordered or notified to do so by the *fire chief*, *fire code official*, or police chief or a duly authorized representative shall be guilty of a misdemeanor, and upon conviction thereof, be punished by a fine of not more than one thousand dollars and/or imprisonment in the county jail for not more than six months, or any combination of such fine and imprisonment. Every day of such violation shall constitute a separate offense.

5608.13 Administrative citations – CC

5608.13 Administrative citations. Any person violating any of the provisions, or failing to comply with any of the requirements, of Title 13 Section 13.04.345 of this code, may be issued a civil administrative citation by the *fire chief*, *fire code official*, or police chief or their designated representative authorized to issue misdemeanor citations, or other civil notices, for such violations. The fines schedule for such administrative citation shall be as follows:

1. For a first violation, a fine not exceeding $250.00 plus costs including but not limited to disposal costs;
2. For subsequent offences within one year of the first offense, a fine not exceeding $500.00 plus costs including but not limited to disposal costs

5608.14 Administrative procedures – CC

5608.14 Administrative procedures. The Administrative Procedures outlined in Title 1, Chapter 1.14.020-1.14.030 shall be the same procedures applicable to Chapter 13.04.345. The administrative provisions outlined in Title 1, Chapter 1.14.040-1.14.130 which refer to the “Chief of Code Enforcement” shall be replaced with “*fire code official*”.

5609 Consumer fireworks – CC

SECTION 5609–CONSUMER FIREWORKS

5609.1 General. Where the distribution, sale, display, or storage of fireworks 1.4G (consumer fireworks) is allowed by Section 5601.1.3, Exceptions 4 and 5, such distribution, sale, display, or storage shall comply with this section, the current *Clark County Fire Department Guideline for Fireworks*, and the applicable requirements of NFPA 1124.

In accordance with the exception to Section 5601.2.2, the purchase of consumer fireworks by members of the public shall be limited to those consumer fireworks offered for sale between the dates of June 28th to July 4th at portable retail fireworks stands/booths within Clark County.

5609.1.1 Permit required. Permits shall be required as set forth in Section 105.5 and the current *Clark County Fire Department Guideline for Fireworks*.

5609.1.2 Seizure of fireworks – CC

5609.1.2 Seizure of fireworks. It shall be unlawful to possess, use, explode, offer, display for sale, hold or store any and all fireworks in violation of this section. Upon finding unlawful fireworks, the *fire chief*, *building official*, *fire code official* or police chief or their representative shall seize, take, remove or cause to be removed such unlawful fireworks and destroy said unlawful fireworks at the expense of the owner or distribute to the wholesalers for further handling.

5609.1.3 Penalty for violation – CC

5609.1.3 Penalty for violation. Any person operating or maintaining any occupancy, premises or vehicle subject to this regulation who shall permit any hazard to exist on premises under his control or who shall fail to take immediate action to abate a hazard when ordered or notified to do so by the *fire chief*, *building official*, or police chief, or his duly authorized representative, shall be guilty of a misdemeanor, and upon conviction thereof, be punished by a fine of not more than one thousand dollars and/or imprisonment in the county jail for not more than six months, or any combination of such fine and imprisonment. Every day of such violation shall constitute a separate offense. In addition, a disposal fee may be assessed to the party from which illegal fireworks are seized.

5609.1.4 Civil penalty – CC

5609.1.4 Civil penalty. Any person violating any of the provisions, or failing to comply with any of the requirements, of Title 13 Section 13.04.345 of this code, may be issued a civil penalty by the *fire chief*, *building official,* or police chief, or their designated representative authorized to issue misdemeanor citations, or other civil notices, for such violations. The civil penalty shall be as follows:

1. If the gross weight of the fireworks, including the packaging is less than 100 pounds the civil penalty shall be;
    a. $500 plus costs including, but not limited, to disposal costs for the first violation; and
    b. $1,000 plus costs including, but not limited, to disposal costs for a second violation within three (3) years.
2. If the gross weight of the fireworks, including the packaging is more than 100 pounds but less 5,000 pounds than the civil penalty shall be $5,000 plus costs including, but not limited to, disposal costs.
3. If the gross weight of the fireworks, including the packaging is more than 5,000 pounds than the civil penalty shall be $10,000 plus costs including, but not limited to, disposal costs.

The civil penalties assessed in this section shall not be imposed against a person who has been issued a license or permit under Title 13.04 to sell or distribute fireworks nor can they be imposed against a child under the age of eighteen (18) unless the child is emancipated.

5609.1.5 Administrative procedures – CC

5609.1.5 Administrative procedures. The Administrative Procedures outlined in Title 1, Chapter 1.14.020-1.14.030 shall be the same procedures applicable to Chapter 13.04.345. The administrative provisions outlined in Title 1, Chapter 1.14.040-1.14.130 which refer to the "Chief of Code Enforcement" shall be replaced with "*fire code official*."

5609.2 Storage – CC

5609.2 Storage. Where the temporary storage of consumer fireworks, 1.4G is allowed by Section 5601.1.3, Exceptions 4 or 5, such storage shall comply with applicable requirements of NFPA 1124 and currently adopted codes.

5609.2.1 Storage for wholesale consumer fireworks. The storage building/location shall comply with the currently adopted building and fire codes and NFPA 1124. It shall be inaccessible to the public. Wholesale storage locations shall be *approved* by the *fire code official*.

5609.2.2 Storage for retail consumer fireworks. Retail consumer fireworks shall be stored at an *approved* location inside or on the fireworks sales stand or stand premises in an *approved* manner when supervised by an adult that is awake and alert at all times. Storage locations shall be *approved* by the *fire code official*.

5609.2.3 No smoking signs. No smoking signs shall be posted at all storage locations. No smoking signs with 3-inch tall letters shall be posted on all four sides of the storage container or fireworks stand/booth. Signs shall be bilingual (English/Spanish) and shall be painted or stenciled on the stand/booth. The international symbol for "no smoking" can be stenciled above the exit doors on the exterior or on the exit doors of the stand/booth so if the doors are open the required sign is still displayed.

5609.3 Safe and sane consumer fireworks – CC

5609.3 Safe and sane consumer fireworks. All fireworks products for consumer fireworks sales shall be tested (including re-tests) per Section 5609.4 by April 30th each year prior to the date of sale.

5609.3.1 Labels. All fireworks for consumer sales shall bear the California State Fire Marshal's Safe and Sane seal/label. Each item or case of small items or item box shall bear the seal/label.

5609.3.2 Packaging. Retailers shall display and sell consumer fireworks as they are intended and required to be sold per the wholesaler.

5609.3.3 Fireworks construction. The construction and composition of consumer fireworks shall comply with the American Pyrotechnics Association Standard 87-1, and Standard for Construction and Approval for Transportation of Fireworks, Novelties and Theatrical Pyrotechnics. See Annex C of NFPA 1124.

5609.4 Fire prevention bureau requirements before testing and approval – CC

5609.4 Fire prevention bureau requirements before testing and approval. All consumer fireworks products shall be tested and certified by an *approved*, independent third party testing agency for compliance with the regulation of the Consumer Products Safety Commission (CPSC) as set forth in 16 CFR 1500 and 1505. Wholesalers shall have copies of the test reports shall be available for review.

5609.4.1 Fire prevention bureau testing. Each wholesaler shall provide the *fire code official* with a complete inventory list of individual products and packages for sale to consumers at least 90-days in advance of the first day of sale. Testing shall be in accordance with the current *Clark County Fire Department Guideline for Fireworks*. Items that do not pass testing will not be permitted for sale.

5609.4.2 Test method. Each product selected for testing shall be tested according to the current *Clark County Fire Department Guideline for Fireworks*. The pass/fail criteria will be according to these documents. Additionally, no product shall exhibit re-ignition, burn-out or prolonged burning within thirty (30) minutes after the termination of the primary effect produced by the device.

5609.5 Dangerous fireworks – CC

5609.5 Dangerous fireworks. It shall be unlawful for any person to possess, store, to offer for sale, expose for sale, sell at wholesale or retail, or use or explode any dangerous fireworks in the unincorporated towns of Clark County, Nevada. "Dangerous fireworks" include, but are not limited to, the following:

1. Fireworks that contain prohibited chemicals per NFPA 1124;
2. Firecrackers, salutes and other articles which explode;
3. Fireworks that fire an aerial display;
4. Skyrockets and rockets, including all devices which employ any combustible or explosive material and which rise in the air during discharge;

5. Roman candles, including all devices which discharge balls of fire into the air;
6. Sparklers more than ten inches in length or one-fourth inch in diameter;
7. All fireworks designed and intended by the manufacturer to create the element of surprise upon the user. These items include but are not limited to auto foolers, cigarette loads, exploding balls, trick matches;
8. Fireworks known as devil-on-the-walk, or any other fireworks which explode through means of friction;
9. Torpedoes of all kinds which explode on impact;
10. Fireworks kits;
11. Devices that travel a distance exceeding a 10 feet radius.
12. Such other fireworks examined and tested, witnessed by the Southern Nevada Consumer Fireworks Code Committee, *fire chief*, or police chief and determined to possess characteristics of design or construction which make such fireworks unsafe for use by any person not specially qualified or trained in the use of fireworks.

5609.6 Fireworks stands/booths – CC

5609.6 Fireworks stands/booths. Fireworks stands/booths shall be constructed, arranged and have construction and operational features noted in Sections 5609.6.1 through 5609.6.5 and the current *Clark County Fire Department Guideline for Fireworks*.

5609.6.1 Operations. Fireworks stands/booths shall be operated from June 28 to July 4 of every calendar year.

5609.6.1.1 Fireworks shall be returned to an *approved* wholesalers storage location at the end of each sales day unless the stand/booth is *approved* for 24-hour sales. There shall be no storage in other locations including, but not limited to, residential neighborhoods, *dwellings*, garages, public ways, driveways, trailers, or vehicles.

5609.6.2 Certificate of Insurance. The permittee shall furnish a certificate of insurance for hazard coverage of up to $1,000,000, or greater if required by the *fire code official*, in accordance with Section 105.1.7.

5609.6.3 Personnel. Fireworks stands/booths shall be operated by at least one adult, 18 years of age or older. No person under 16 years of age shall be allowed to sell consumer fireworks.

5609.6.4 Construction of Fireworks Stands/Booths. Each fireworks stand shall be constructed as follows:

1. No stand/booth shall exceed 16 feet 6 inches in length or 8 feet in width.
2. All stands shall have no less than two unobstructed exits measuring a minimum of 6 feet tall and 2 feet in width. The counter shall not be considered an exit.
3. The siding and roof of the booths shall be made of a minimum of ¼-inch plywood or comparable material or of noncombustible materials.
4. All wiring and appliances shall meet the requirements of NFPA 70 and be protected from damage.
5. Overhead wiring powering fireworks stands/booths shall be a minimum of 13 feet, 6 inches above grade.
6. Trailers used as fireworks stands/booths may be used when *approved*.

5609.6.5 Fire safety features. Each fireworks stand/booth shall have the following fire safety features;

1. A fully-charged mounted fire extinguisher rated at least 2A:10BC. The fire extinguisher shall be tagged by a contractor licensed by the Nevada State Fire Marshal.
2. "No Smoking" signs shall be posted at all storage locations. No smoking signs with 3-inch tall letters shall be posted on all four sides of the storage container or fireworks stand/booth. Signs shall be bilingual (English/Spanish) and shall be painted or stenciled on the stand/booth. The international symbol for "no smoking" can be stenciled above the exit doors on the exterior or on the exit doors of the stand/booth so if the doors are open the required sign is still displayed.
3. Clear space between the fireworks stand/booth and exposures as noted in Table 5609.6.5:
    - 3.1. Roof tarps may be attached to the roof of a fireworks booth/stand provided they are flame retardant and secured firmly with a 1” screw and washer through the tarp grommets. Tarps shall not hang greater than 1 foot beyond the fireworks stand/booth. Tarps shall not block no smoking signs.
    - 3.2. Pop ups may be placed up against fireworks booths/stands but shall not be attached to the booth. Pop ups shall be secured to the ground by water barrel, sand, or other *approved* method such that the pop up will withstand the elements of weather and not endanger persons, structures, property or vehicles.

TABLE 5906.5 – MINIMUM SEPARATION DISTANCE FROM FIREWORKS STAND/BOOTH.			
10 FEET	**20 FEET**	**30 FEET**	**50 FEET**
• Vehicle parking • Curb of edge of roadway, street, or driveway • Air/water dispensers	• Buildings • Tents • Fireworks storage • Temporary generators • Underground storage tank fill port	• Combustibles including empty product boxes, dry grass, dry brush, and any combustible debris	• Motor vehicle fuel dispensers • Propane dispensers • Compressed natural gas dispensing facilities • Aboveground storage tanks for flammable or combustible liquids or flammable compressed gases including propane • Any cooking equipment • Ignition sources including matches lighters, etc. • Other fireworks stands/booths
For SI: 1 foot = 304.8 mm.			

5609.7 Ignition of fireworks—hazardous locations – CC

5609.7 Ignition of fireworks—hazardous locations. Ignition of fireworks shall not take place within 300 feet of a fireworks booth, fuel service station buildings, fuel dispensers, flammable or combustible liquid tank fill or vent lines, aboveground flammable or combustible liquid tanks, or any building, structure or vehicle containing unsealed flammable or combustible liquids, hazardous materials or explosives.

5609.7.1 Ignition of fireworks—general prohibition. Ignition of fireworks shall take place so as to not endanger persons, buildings, structures, property, brush, automotive vehicles and/or equipment, etc.

5609.7.2 Ignition of fireworks—prohibited dates. Ignition of fireworks shall not take place before the 28th day of June or after the 4th day of July of each sales year.

5609.8 Retailer training – CC

5609.8 Retailer training. Wholesalers shall be responsible for holding orientation/training meetings. These meetings shall be in compliance with the current *Clark County Fire Department Guideline for Fireworks*. Each retailer shall be required to attend a meeting and produce a certificate of attendance prior to the approval to sell fireworks.

5704.2.9.2 Fire protection – SN

5704.2.9.2 Fire protection. Fire protection for above-ground tanks shall comply with Sections 5704.2.9.2.1 through 5704.2.9.2.5.

5704.2.9.2.5 Fire flow – SN

5704.2.9.2.5 Fire flow. Fire flow shall be based on the flashpoint of the most hazardous liquid stored and the estimated foam requirement for the largest tank in accordance with Table 5704.2.9.2.5(a) and Table 5704.2.9.2.5(b). The minimum fire flow provided shall be equal to the sum of flows required by these tables. Minimum fire flow duration shall be four hours.

TABLE 5704.2.9.2.5(a)
FIRE FLOW FOR TANKS STORING
FLAMMABLE AND COMBUSITBLE LIQUIDS[a]

FLASH POINT OF LIQUID	LARGEST TANK	LARGEST EXPOSED TANK
<140°F (60°C)	1000 gpm[b]	500 gpm[b]
≥140°F (60°C)	750 gpm	250 gpm

For SI: 1 gallon per minute = 3.785L/m.

a. Required flows may be reduced by half for horizontal tanks.

b. Add 250 gpm for each 100ft. increase in tank diameter above 100 ft.

TABLE 5704.2.9.2.5(b)
ESTIMATED WATER DEMAND FOR
FIXED FOAM PROTECTION FOR A FULL SURFACE FIRE

TANK DIAMETER (feet)	WATER DEMAND (gallons per minute)
50	200
100	800
150	2000
200	3200
250	5000
300	7100

For SI: 1 foot = 3048 mm, 1 gallon per minute = 3.785L/m.

5704.2.13.1.3 Out of service for one year – SN

5704.2.13.1.3 Out of service for one year. Underground tanks that have been out of service for a period of one year shall be removed from the ground in accordance with Section 5704.2.14. Coordination and compliance with Environmental Health Division of Southern Nevada Health District for tank removal is the responsibility of the *owner* and contractor.

5704.2.13.1.4 Tanks abandoned in place – SN

5704.2.13.1.4 Tanks abandoned in place. This section is deleted from the IFC.JUSTIFICATION: To minimize risk of environmental damage, abandoned tanks are required to be removed.

5704.5 Generator and fire pump diesel fuel tanks – SN

5704.5 Generator and fire pump diesel fuel tanks.

5704.5.1 Exterior installations. Exterior installations shall be in accordance with this section.

5704.5.1.1 Secondary containment. Tanks shall be listed and labeled as a secondary containment tank in accordance with UL 142 or shall be a UL 2085 tank.

5704.5.1.2 Separation distances. Aboveground tanks shall be separated from property lines, important buildings, public ways, and other tanks in accordance with NFPA 30.

5704.5.2 Interior installations. Interior installations of aboveground fuel tanks shall comply with Chapters 6, 50 and 57.

5706.5.1.6 Fire protection – SN

5706.5.1.6 Fire protection. Fire protection shall be in accordance with Section 5703.2. Where vehicle operations involve vehicle loading of Class I and/or Class II liquids, the loading areas shall be protected with *approved* automatic fire protection systems.

5706.5.4.5 Commercial, industrial, governmental or manufacturing – SN

5706.5.4.5 Commercial, industrial, governmental or manufacturing. Dispensing of Class I, II and III motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles located at commercial, industrial, governmental or manufacturing establishments is allowed where *approved*, provided that such dispensing operations are conducted in accordance with the following:

1. Dispensing shall occur only out of *mobile fueling* vehicles that have been issued a permit to conduct *mobile fueling* by the jurisdiction where the business license address is located.
2. The *owner* of a *mobile fueling* operation shall provide to the jurisdiction a written response plan that demonstrates readiness to respond to a fuel spill and carry out appropriate mitigation measures, and describes the process to dispose properly of contaminated materials.
3. A detailed site plan shall be submitted with each application for a permit. The site plan shall indicate: all buildings, structures and appurtenances on site and their use or function; all uses adjacent to the *lot lines* of the site; the locations of all storm drain openings, adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained on the site property; and the scale of the site plan.

   Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings or off-site. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills or other *approved* means.
4. The *fire code official* is allowed to impose limits on the times and days during which *mobile fueling* operations is allowed to take place, and specific locations on a site where fueling is permitted.
5. *Mobile fueling* operations shall be conducted in areas not open to the public or shall be limited to times when the public is not present.
6. *Mobile fueling* shall not take place within 15 feet (4572 mm) of buildings, property lines, combustible storage or storm drains.

Exceptions:

1. The distance to storm drains shall not apply where an *approved* storm drain cover or an *approved* equivalent that will prevent any fuel from reaching the drain is in place prior to fueling or a fueling hose being placed within 15 feet (4572 mm) of the drain. Where placement of a storm drain cover will cause the accumulation of excessive water or difficulty in conducting the fueling, such cover shall not be used and the fueling shall not take place within 15 feet (4572 mm) of a drain.
2. The distance to storm drains shall not apply for drains that direct influent to *approved* oil interceptors.

7. The tank vehicle shall comply with the requirements of NFPA 385 and local, state and federal requirements. The tank vehicle's specific functions shall include that of supplying fuel to motor vehicle fuel tanks. The vehicle and all its equipment shall be maintained in good repair.
8. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the tank vehicle or the point of fueling shall be prominently posted on three sides of the vehicle including the back and both sides.
9. A portable fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.
10. The dispensing nozzles and hoses shall be of an *approved* and *listed* type.
11. The dispensing hose shall not be extended from the reel more than 1 00 feet (30 480 mm) in length.
12. Absorbent materials, nonwater-absorbent pads, a 1 0-foot-long (3048 mm) containment boom, an *approved* container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.
13. Tank vehicles shall be equipped with a "fuel limit" switch such as a count-back switch, to limit the amount of a single fueling operation to not more than 500 gallons (1 893 L) before resetting the limit switch.

    Exception: Tank vehicles where the operator carries and can utilize a remote emergency shutoff device that, when activated, immediately causes flow of fuel from the tank vehicle to cease.
14. Persons responsible for dispensing operations shall be trained in the appropriate mitigating actions in the event of a fire, leak or spill. Training records shall be maintained by the dispensing company.
15. Operators of tank vehicles used for *mobile fueling* operations shall have in their possession at all times an emergency communications device to notify the proper authorities in the event of an emergency.
16. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.
17. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.
18. The engines of vehicles being fueled shall be shut off during dispensing operations.
19. Nighttime fueling operations shall only take place in adequately lighted areas.
20. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.
21. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.
22. Motor vehicle fuel tanks shall not be topped off.

23. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the tank vehicle.
24. The *fire code official* and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.
25. Operators shall place a drip pan or an absorbent pillow under each fuel fill opening prior to and during dispensing operations. Drip pans shall be liquid-tight. The pan or absorbent pillow shall have a capacity of not less than 3 gallons (1 1.36 L). Spills retained in the drip pan or absorbent pillow need not be reported. Operators, when fueling, shall have on their person an absorbent pad capable of capturing diesel fuel overfills. Except during fueling, the nozzle shall face upward and an absorbent pad shall be kept under the nozzle to catch drips. Contaminated absorbent pads or pillows shall be disposed of regularly in accordance with local, state and federal requirements.

6104.2 Maximum capacity within established limits – SN

6104.2 Maximum capacity within established limits. For the protection of heavily populated or congested areas, storage of liquified petroleum gas shall not exceed an aggregate water capacity in any one installation of 2,000 gallons (7570 L) within the limits established by law as set forth in the fire code adoption ordinance or other regulation adopted by the jurisdiction.

Chapter 80 Referenced standards – SN/CC

14–24: **Standard for the Installation of Standpipe and Hose Systems**
905.2, 905.3.4, 905.4.2, 905.6.2, 905.8

58–24: **Liquified Petroleum Gas Code**
2311.5, 3903.6, 4101.6.4, 6101.1, 6103.1, 6103.2.1, 6103.2.1.2, 6103.2.1.7, 6103.2.2, 6104.1, 6104.3.2, 6104.4, 6105.2, 6106.2, 6106.3, 6107.2, 6107.4, 6108.1, 6108.2, 6109.11.2, 6111.3

54–24: **National Fuel Gas Code**

130–23: **Standard for Fixed Guideway Transit and Passenger Rail Systems**
4204.4.1

140–24: **Motion Picture and Television Production Studio Soundstages, Approved Production Facilities, and Production Locations**

418–21: **Standard for Heliports**
105.6.33, 2007.1

B102.1 Definitions – CC

B102.1 Definitions. For the purpose of this appendix, certain terms are defined as follows:

FIRE-FLOW. The flow rate of a water supply, measured at 20 pounds per square inch (psi) (138 kPa) residual pressure, that is available for firefighting.

FIRE-FLOW CALCULATION AREA. The floor area, in square feet (m^2), used to determine the required fire flow.

RURAL AREA. For commercial and multi-unit residential buildings, an area that is more than 1 mile (1.6 km) from public water systems capable of providing the required *fire-flow*. For detached one-family *dwellings*, an area that is more than 1,000 feet (304.8 m) from public water systems capable of providing the required *fire-flow*.

B103.1 Decreases – CC

B103.1 Decreases. The *fire code official* is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in *rural areas* or small communities where the development of full fire-flow requirements is impractical, in accordance with Sections B103.1.1 through B103.1.2.

B103.1.1 Buildings other than one-family dwellings. For buildings other than one-family *dwellings*, reduction in *fire-flow* shall be in accordance with Sections B103.1.1.1 through B103.1.1.3.

B103.1.1.1 Buildings less than 2,000 square feet (186 m^2). For buildings other than Group A, E, H, I and R occupancies less than 2,000 square feet (186 m^2) in area, *fire-flow* is not required where the building is a minimum of 30 feet (9144 mm) from all real and assumed property lines to property with an existing structure or that can be built upon.

For buildings with Group A, E, H, I and R occupancies less than 2,000 square feet (186 m^2) in area, *fire-flow* is not required where the building is a minimum of 30 feet (9144 mm) from all real and assumed property lines to property with an existing structure or that can be built upon and where provided with an *approved automatic sprinkler system*.

B103.1.1.2 Buildings 2,000 square feet (186 m^2) or greater that do not otherwise require fire sprinklers. For buildings 2,000 square feet (186 m^2) or greater where an *automatic sprinkler system* is not otherwise required, the installation of an *approved automatic sprinkler system* in accordance with this code shall be allowed to provide protection in lieu of *fire-flow*, where the building is a minimum of 30 (9144 mm) feet from all real and assumed property lines to property with an existing structure or that can be built upon.

B103.1.1.3 Buildings that require fire sprinklers. Where an *automatic sprinkler system* is otherwise required, *fire-flow* shall be provided without decrease in minimum required flow or duration.

B103.1.2 One-family dwellings. For one-family *dwellings*, *fire-flow* is not required where an *approved automatic sprinkler system* is provided in accordance with Section 903.3.1.3.

B105.1 One- and two-family dwellings, group R-3 and R-4 buildings and townhouses – SN

B105.1 One- and two-family dwellings, group R-3 and R-4 buildings and townhouses. The minimum *fire-flow* and flow duration requirements for one- and two-family *dwellings*, Group R-3 and R-4 buildings and *townhouses* shall be as specified in Tables B105.1(1) and B105.1(2).

B105.2 Buildings other than one- and two-family dwellings, group R-3 and R-4 buildings and townhouses – SN

B105.2 Buildings other than one- and two-family dwellings, group R-3 and R-4 buildings and townhouses. The minimum *fire-flow* and flow duration for buildings other than one- and two-family *dwellings*, Group R-3 and R-4 buildings and *townhouses* shall be as specified in Tables B105.1(2) and B105.2.

TABLE B105.1(1)–REQUIRED FIRE FLOW FOR ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES		
FIRE-FLOW CALCULATION AREA (square feet)	**MINIMUM FIRE FLOW (gallons per minute)**	**FLOW DURATION (hours)**
0–3,600	1,000	1
3,601 and greater	50% of the value in Table B105.1(2)[a]	Duration in Table B105.1(2) at the required fire-flow rate
For SI: 1 square foot = 0.0929 m2, 1 gallon per minute = 3.785 L/m. a. The reduced fire flow shall be not less than 1,000 gallons per minute.		

TABLE B105.2–REQUIRED FIRE FLOW FOR BUILDINGS OTHER THAN ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES		
AUTOMATIC SPRINKLER SYSTEM (Design Standard)	**MINIMUM FIRE FLOW (gallons per minute)**	**FLOW DURATION (hours)**
No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2)
Section 903.3.1.1 of the *International Fire Code*	Aircraft Maintenance Hangars: 100% High-piled Combustible Storage: 75% High-rise Buildings: 75% All other Buildings: 50% of the value in Table B105.1(2)[a]	Duration in Table B105.1(2) at the reduced flow rate
Section 903.3.1.2 of the *International Fire Code*	50% of the value in Table B105.1(2)[a]	Duration in Table B105.1(2) at the reduced flow rate
For SI: 1 gallon per minute = 3.785 L/m. a. The reduced fire flow shall be not less than 1,500 gallons per minute.		

Appendix C Fire protection water supplies and fire hydrant locations and distribution – SN/CC

APPENDIX C FIRE PROTECTION WATER SUPPLIES AND FIRE HYDRANT LOCATIONS AND DISTRIBUTION

SECTION C101–GENERAL

C101.1 Scope. Fire hydrants shall be provided in accordance with this appendix for the protection of buildings, or portions of buildings, as required by Section 507. Fire protection water supplies shall be designed in accordance with Section 507 and this appendix. Designs shall comply with the Clark County Uniform Design and Construction Standards (UDACS) for public installations or NFPA 24 for private installations, as applicable.

C101.2 Improvements. When a property or *lot* with existing fire hydrant protection is further developed or changed, and such change or development requires an increased fire flow than what the original fire hydrant and fire protection water supply system provides, the existing fire hydrants and fire protection water supply system are required to be upgraded to meet the requirements of this appendix, Section 507, the Clark County Uniform Design and Construction Standards (UDACS) for public installations or NFPA 24 for private installations, as applicable.

C102 Fire hydrant locations – SN/CC

SECTION C102–LOCATION

C102.1 Fire hydrant locations. Fire hydrants shall be provided along required fire apparatus access roads.

C102.2 Intersections. The spacing of fire hydrants shall start by placing fire hydrants at all intersections.

C102.3 R-3 occupancies built under the International Residential Code. In all residential areas with one- and two-family *dwellings* and *townhouses*, hydrants shall be spaced not to exceed 500 feet (152.4 m).

C102.4 Distance from hydrant to R-3 occupancies built under the International Residential Code. The maximum distance from a one- or two-family *dwelling* or *townhouse* to a fire hydrant shall not exceed 300 feet (91.4 m), as measured from an *approved* point on a street or road frontage to a fire hydrant. An *approved* point is defined as the property line furthest from the hydrant, at a right angle to the street.

C102.5 Commercial and residential occupancies other than R-3 occupancies built under the International Residential Code. In all commercial and industrial areas, including multi-family R-1 and R-2 occupancies, hydrants shall be spaced not to exceed 300 feet (91.4 m), or 400 feet (121.9 m) if all buildings are protected by *approved automatic sprinkler systems*.

C102.6 Distance to dead-end street. The maximum distance from a hydrant to the end of a dead-end street shall not exceed 200 feet (60.9 m).

C102.7 Distance to a fire department connection. The maximum distance from a fire hydrant to a fire department connection (FDC) supplying fire sprinklers and/or standpipes shall not exceed 100 feet (30.48 m), as measured by an *approved* route. An *approved* route is defined as an unobstructed path of travel on which hose can easily be laid.

> **Exception:** The distance shall be permitted to exceed 100 feet (30.48 m) only where *approved* by the *fire code official*.

C102.8 Spacing along major streets. Where streets are provided with median dividers, or have four or more travel lanes and a traffic count of more than 30,000 vehicles per day, hydrants shall be spaced at a maximum of 1,000 feet (304.8 m) along both sides of the street; arranged on an alternating basis at 500–foot (152.4 m) intervals.

C102.9 Hydrants provided with new water mains. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet (304.8 m) to provide water for transportation hazards.

C102.10 Hydrant clearances from structures. No fire hydrant shall be located within 6 feet (1829 mm) of a driveway, power pole, light standard, or any other obstruction. For wall, fence and planter locations, a perimeter around the hydrant measuring a minimum of 3 feet (914 mm) from its exterior shall be maintained clear of all obstructions at all times.

C102.11 Hydrants prohibited in cul-de-sacs. Hydrants shall not be placed in the circular portion of a cul-de-sac.

C102.12 Hydrant set-back from curbs. Fire hydrants shall be located 4 feet (1219 mm) to 7 feet (2134 mm) from the back of curb. Where it is not possible to locate the hydrant a minimum of 4 feet (1219 mm) from the back of the curb, the hydrant shall be protected against vehicular impact in accordance with Section 312.

C102.13 Hydrant pad. A concrete pad, in accordance with UDACS plate #40, with minimum dimensions of 3 feet (914 mm) by 3 feet (914 mm), with a minimum depth of 10 inches (254 mm) reinforced with a minimum of #4 rebar installed throughout the pad, shall be provided at each fire hydrant.

C103 Approved fire hydrants – SN

SECTION C103–APPROVED FIRE HYDRANTS

C103.1 Scope. Hydrants that are proposed for installation in public water systems shall be in accordance with *approved* fire hydrants as allowed by the water purveyor. Hydrants proposed for installation on private water systems shall be in accordance with *approved* fire hydrants as allowed by the fire department.

C104 Supply and underground mains – SN/CC

SECTION C104–SUPPLY AND UNDERGROUND MAINS

C104.1 Supply points. Two sources of water supply are required whenever 4 or more fire hydrants and/or sprinkler (per Section 903.3.1.1 and/or 903.3.1.2) lead-ins are installed on a single system. Two connections to the same main shall be permitted provided that the main is valved such that an interruption can be isolated.

C104.2 Sectional control valve. For systems required to have two sources of water supply in accordance with Section C104.1, sectional control valves shall be installed so that no more than 2 fire hydrants and/or fire sprinkler (per Section 903.1.1 and/or 903.3.1.2 only) lead-ins can be out of service due to a service interruption.

C104.3 Sprinkler laterals. Any control valves in the fire sprinkler lateral must be post indicator valve (PIV) type, electrically supervised, and installed in accordance with NFPA 24.

> **Exception:** When prior approval is obtained from the *fire code official*, gate valves in underground water lines may be abandoned in place. The *fire code official* shall witness the abandonment of the valve.

C104.4 Minimum size of line. Supply lines feeding multiple fire hydrants shall have a minimum diameter of 8 inches (200 mm), with a dead-end maximum length of 150 feet (45.7 m) of 6-inch (150 mm) underground pipe supplying only one hydrant.

C104.5 Pressure rating. Underground piping shall have a minimum working pressure of 150 psi (Class 235). Underground piping connected to a fire pump or a fire department connection (FDC) shall have a minimum working pressure of 200 psi (Class 305).

C104.6 Restraint. All underground water lines shall be restrained in accordance with applicable codes and standards.

C104.7 Listings. All onsite underground water mains and materials shall be UL listed, AWWA compliant, and shall be rated for the appropriate working pressure.

C105 Satisfying fire flow requirements – SN/CC

SECTION C105–SATISFYING FIRE FLOW REQUIREMENTS (IN ACCORDANCE WITH APPENDIX B)

C105.1 Minimum number of hydrants. The minimum number of fire hydrants required to meet the fire flow shall be based on a maximum flow of 1,000 gallons per minute (3785 L/m) per hydrant. All hydrants utilized in providing the fire flow shall be within 750 feet (228 600 mm) of the structure being protected as measured along the street or *approved* fire apparatus access road.

> **Exception:** In unincorporated Clark County and the City of Las Vegas the maximum flow per hydrant shall be 1,500 gallons per minute (5678 L/m).

C105.2 Hydrants on adjacent properties. Fire hydrants on adjacent properties shall not be considered unless fire apparatus access roads extend between properties and recorded easements are established.

C105.3 On-site capacity. The minimum fire flow to be provided on-site shall be in accordance with this section. Where on-site fire hydrants are provided, the minimum required fire flow shall be the greater of 1,500 gallons per minute (5678 L/m) or one-half of the required fire flow of the most demanding building on the property.

C106 Construction operations – SN/CC

SECTION C106–CONSTRUCTION OPERATIONS

C106.1 Construction Hydrants. Hydrants shall be provided for construction in accordance with Section 3307.2.

C106.2 Placing hydrant out of service. If during construction it becomes necessary to close any control valve or place a hydrant out of service, approval shall be obtained from the *fire code official* prior to placing the hydrant out of service.

C107 Hydrant Markings – SN/CC

SECTION C107–HYDRANT MARKINGS

C107.1 Hydrant Markings. Hydrants shall be painted safety yellow for public and safety red for private, shall have their location marked in the adjacent fire access lane by a blue reflective pavement marker and shall have red painted curbs 15 feet (4572 mm) in each direction. Hydrant markings shall be in accordance with Section 507.

C107.2 Hydrant Marking Maintenance. Hydrant markings shall be maintained in accordance with Section 507.

Appendix D Civil improvement plans – CC

Appendix D **CIVIL IMPROVEMENT PLANS**

SECTION D101–GENERAL

D101.1 Civil engineering plans for water supply and fire department access. Civil engineering plans shall be in accordance with the requirements of this appendix.

D102 Civil engineering plans – CC

SECTION D102–CIVIL ENGINEERING PLANS

D102.1 Civil engineering plans. Plans shall include, at minimum, the following information:

1. Vicinity map indicating major cross streets adjacent to project, as well as actual project location.
2. Fire Department General Notes shall be provided in accordance with Section D102.2.
3. A Fire Prevention signature block shall be provided on all utility sheets in accordance with Figure D102.1(1).
4. A Fire Flow Information Block shall be provided for each building or structure in accordance with Figure D102.1(2).
5. Locations of water main connections, stubs, etc.
6. Location, size, and type of all underground fire sprinkler system laterals.
7. Location, size, and type of new and existing water mains.
8. Location, number, and type of new, relocated and existing fire hydrants.
9. Location of sectional and control valves.
10. Locations, size and type of new and/or existing public backflow preventers and water meter assemblies.
11. Details of thrust blocks in accordance with UDACS and NFPA 24.
12. Curb lines, sidewalks, alleys, driveways, walls, fences, property lines, vehicle parking layouts (indicate whether or not parking is covered or uncovered), power poles, adjacent structures, all on-site buildings, any other items which are pertinent to hydrant placement.
13. Emergency vehicle access plan indicating fire apparatus access road on and off property, in accordance with this code. Fire apparatus access road widths must be provided, including details of all street sections.

Figure D102.1(1)–Fire Prevention Signature Block

Signature/Stamp_____ Date_____
Approval of these plans shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of the state or county laws. Fire Flow = _____gpm at 20psi residual.

Figure D102.1(2)–Fire Flow Information Block

Fire Flow Information Block	
Type of Construction:	
Total Fire Area:	
Number of Stories:	
Building Height:	
High-rise Building:	_____ Yes _____ No
High-piled Combustible Storage:	_____ Yes _____ No
IBC Use Group(s):	
Sprinkler System:	_____ Yes _____ No
If Yes, Specify Type:	_____ 13 _____ 13R _____ 13D
Number of New Hydrants Installed:	
Fire Flow from Private Hydrant(s):	_____ gpm
Fire Flow from Public Hydrant(s):	_____ gpm
Total Fire Flow:	_____ gpm at 20psi

D102.2 Fire department general notes. The Fire Department General Notes shall be in accordance with the following:

FIRE DEPARTMENT GENERAL NOTES

GENERAL

a. All work shall be done in strict accordance with the Clark County Fire Code as amended, the Uniform Design and Construction Standards (UDACS) as adopted by the water purveyor and the currently adopted edition of NFPA 24.

b. Fire hydrants and water supplies for fire protection shall be installed, inspected by Fire Prevention and in service prior to and during the time of construction in accordance with Section 3307 of the IFC, as amended. Fire hydrants shall be within 300 feet of combustible materials.

c. If during construction it becomes necessary to close any control valve or place a hydrant out of service, approval shall be obtained from the Clark County Fire Prevention prior to placing the hydrant out of service.

FIRE HYDRANTS

a. Fire hydrants shall be installed in accordance with the Clark County Fire Code as amended, the Uniform Design and Construction Standards (UDACS) as adopted by the water purveyor and the currently adopted edition of NFPA 24. Fire hydrants shall be maintained in accordance with NFPA 25 and kept in an operative condition with the required water supply.

b. Manufacturer and model of fire hydrants shall conform to the *approved* materials list of the water purveyor.

c. Hydrants shall be installed with their pumper outlet nozzle (steamer connection) facing the fire access road. A 3-foot clear space shall be maintained around the circumference of fire hydrants. Where hydrants are subject to impact by motor vehicles, guard posts (pipe bollards) shall be installed in accordance with Section 312.

d. Public hydrants shall be painted safety yellow and private hydrants shall be painted red.

e. Fire hydrants shall be located 4 to 7 feet from back of curb.

f. Painting of curbs and/or asphalt areas adjacent to hydrants shall be completed by the installer prior to bond release inspection. A coat of exterior industrial grade safety red enamel shall be applied for a minimum of 30 feet (15 feet on each side of the hydrant).

g. Hydrant locations shall be marked by means of a blue reflective pavement marker installed in the center of the fire access drive lane nearest to the hydrant.

FIRE DEPARTMENT CONNECTIONS

a. Fire department connections shall be located within 100 feet of a fire hydrant as measured by an *approved* unobstructed route. An *approved* route is defined as an unobstructed path of travel on which hose can easily be laid.

b. Fire department connections shall be located on the fire department access side of buildings, fully visible and recognizable from the access road or nearest point of fire department vehicle access (fire lane) or as otherwise *approved* by the *fire code official*.

c. Fire department connections shall not be closer than 3 feet to any door or window opening and shall not be obstructed by trees, shrubs, parking spaces, etc.

d. Fire department connections shall be located not less than 18 inches and not more than 48 inches above the level of the adjacent grade or access level.

UNDERGROUND PIPING & VALVES

a. Underground piping shall have a minimum working pressure of 150 psi (class 235). Underground piping connected to a fire pump or a fire department connection (FDC) shall have a minimum working pressure of 200 psi (class 305).

b. For private fire service mains two sources of water supply are required whenever 4 or more fire hydrants and/or fire sprinkler lead-ins are installed on a single system. Water systems under the purview of the Las Vegas Valley Water District shall conform to the Las Vegas Valley Water District rules.

c. For private fire service mains sectional control valves shall be installed so that no more than 2 fire hydrants and/or fire sprinkler in building risers (lead-ins) can be out of service due to a break in a water main. Water systems under the purview of the Las Vegas Valley Water District shall conform to the Las Vegas Valley Water District rules.

d. All piping and valves supplying fire sprinkler systems shall be protected from freezing when exposed to temperatures less than 40°F. Freeze protection shall be *approved* by Clark County Fire Prevention and be durable and permanent.

e. All required hydrostatic testing and flushing of the private fire service main or underground fire sprinkler/standpipe water supply piping shall be performed in the presence of Clark County Fire Prevention staff. The piping joints shall be uncovered until inspected. The installing contractor shall furnish a “contractor’s material and testing certificate” (CM&T) countersigned by the property owner or representative. The CM&T shall be filled out completely with the inspector’s initials, witnessing each test. A copy of the underground flush and hydrostatic testing documentation shall be on-site and signed prior to the connection of the underground water supply to the fire sprinkler system.

GATES

a. Shop drawings for all gates and motorized openers serving fire department access roads shall be submitted separately under a separate permit for review by the Clark County Building Department and Fire Prevention and receive approval prior to their installation.

FIRE APPARATUS ACCESS ROADS

a. Speed bumps and/or speed humps shall not be permitted within the required width of fire apparatus access roads.

Exceptions:

1. Speed humps are allowed on private fire apparatus access roads serving commercial and industrial buildings when *approved* by the *fire code official*.
2. Rumble strips are allowed on private fire apparatus access roads serving residential, commercial and industrial buildings when *approved* by the *fire code official*.

b. A maximum of six single family homes constructed in accordance with the IRC may be situated on a 25-foot-wide street (stub street) having a maximum length of 150 feet. The minimum width shall be 25 feet measured from back-of-curb to back-of-curb and on-street parking shall be prohibited on such stub streets.

c. Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus, with a minimum vehicle load of 33,000 pounds per axle, and shall be surfaced and paved so as to provide all-weather driving capabilities.

d. Fire apparatus access roads including elevated portions shall be designed with a ground bearing capacity not less than 75 psi over the ground contact area

D103 Fire protection water supply and fire hydrants – CC

SECTION D103–FIRE PROTECTION WATER SUPPLY AND FIRE HYDRANTS

D103.1 General. The design and installation of the fire protection water supply and fire hydrant systems shall be in accordance with Section 507 & Appendix C.

D104 Fire apparatus access roads – CC

SECTION D104–FIRE APPARATUS ACCESS ROADS

D104.1 General. Fire apparatus access roads shall be in accordance with Chapter 5, and this section.

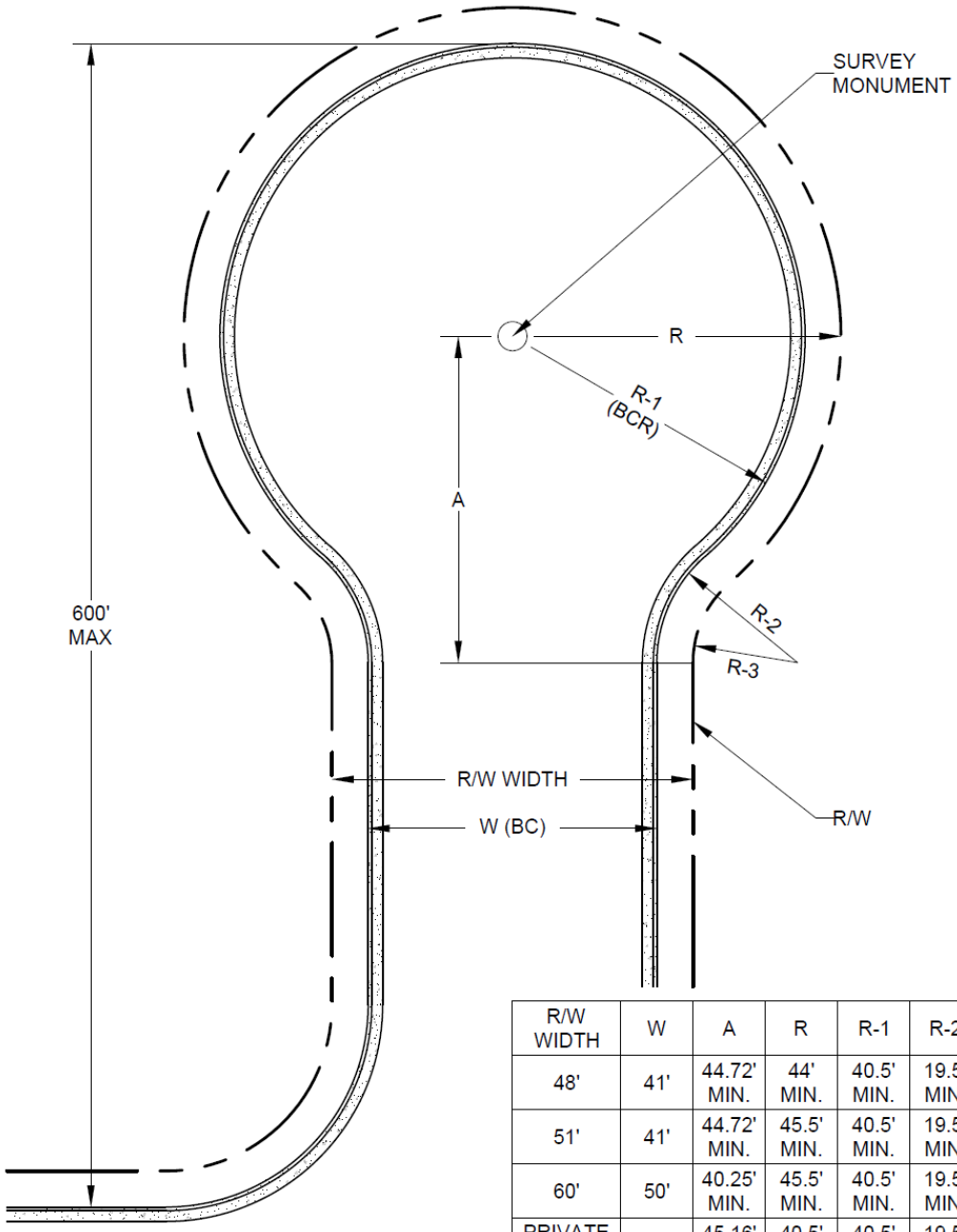
D104.2 Dead ends. Dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with *approved* provisions for the turning around of fire apparatus. Dead-end streets shall be measured from the curb face of the intersecting street to the curb face of the dead-end.

Dead-end streets up to and including 600 feet in length it shall be acceptable to use the detail shown in Figure D104.2(1), based on the Clark County Regional Transportation Commission Uniform Standard Drawings (RTC) detail 212.

Exception: For single family residential developments, it shall be acceptable to use Figure D104.2(2), based on RTC detail 212.1.S1.

Dead-end streets in excess of 600 feet in length shall use one of the *fire code official's approved* fire apparatus turn around designs, DFPB 1-4, as shown in Figures D104.2(3) through D104.2(6).

Figure D104.2(1)–Dead-End Turnaround, Reduced Cul-de-sac



R/W WIDTH	W	A	R	R-1	R-2	R-3
48'	41'	44.72' MIN.	44' MIN.	40.5' MIN.	19.5' MIN.	16' MIN.
51'	41'	44.72' MIN.	45.5' MIN.	40.5' MIN.	19.5' MIN.	14.5' MIN.
60'	50'	40.25' MIN.	45.5' MIN.	40.5' MIN.	19.5' MIN.	14.5' MIN.
PRIVATE STREET	40'	45.16' MIN.	40.5' MIN.	40.5' MIN.	19.5' MIN.	19.5' MIN.

FIRE DEPARTMENT TURNAROUND DETAIL
BASED ON RTC STANDARD DRAWING #212.

Figure D104.2(2)–Dead-End Turnaround, Reduced Hammerhead

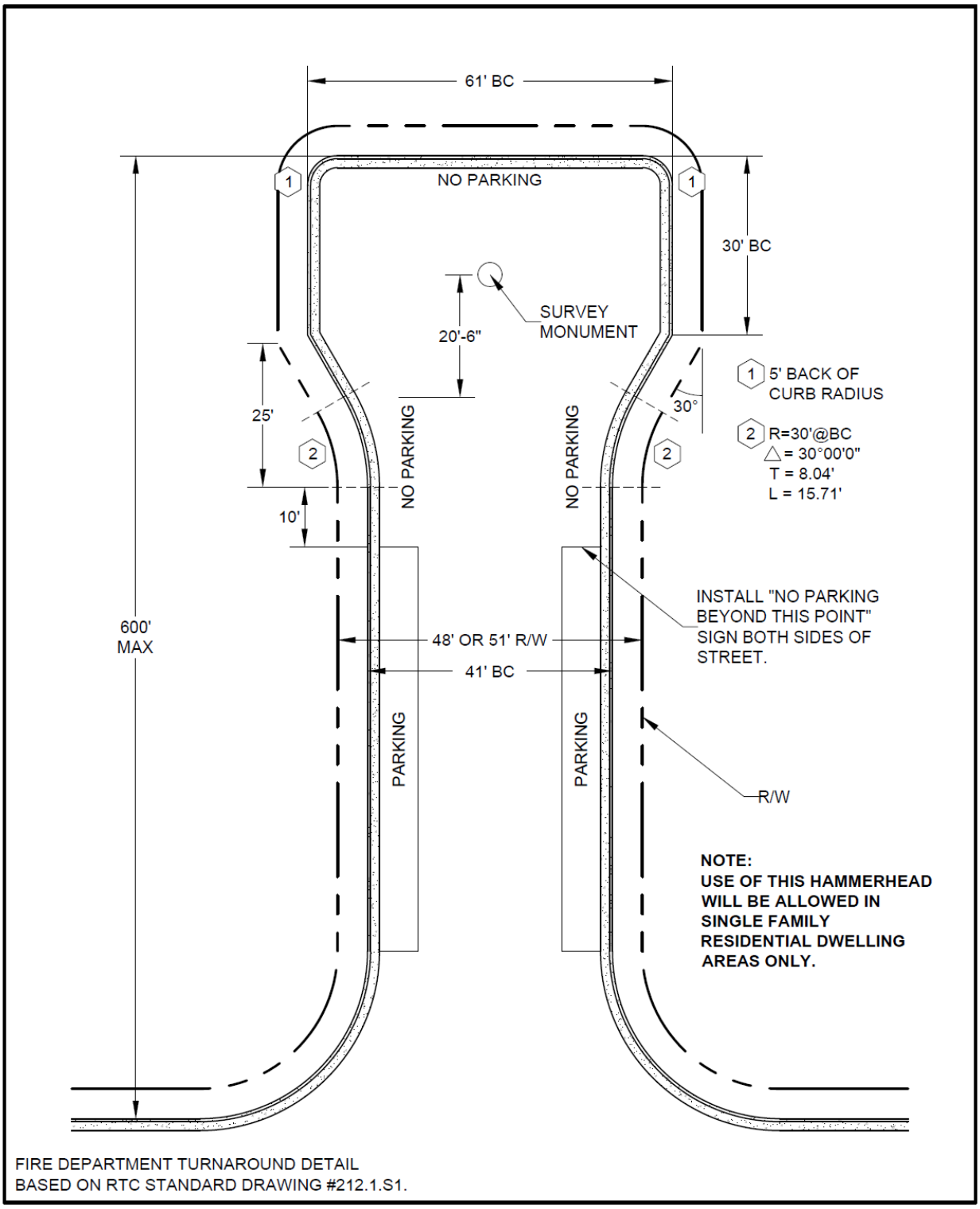


Figure D104.2(3)–Dead End Turnaround, 116-foot Cul-de-sac

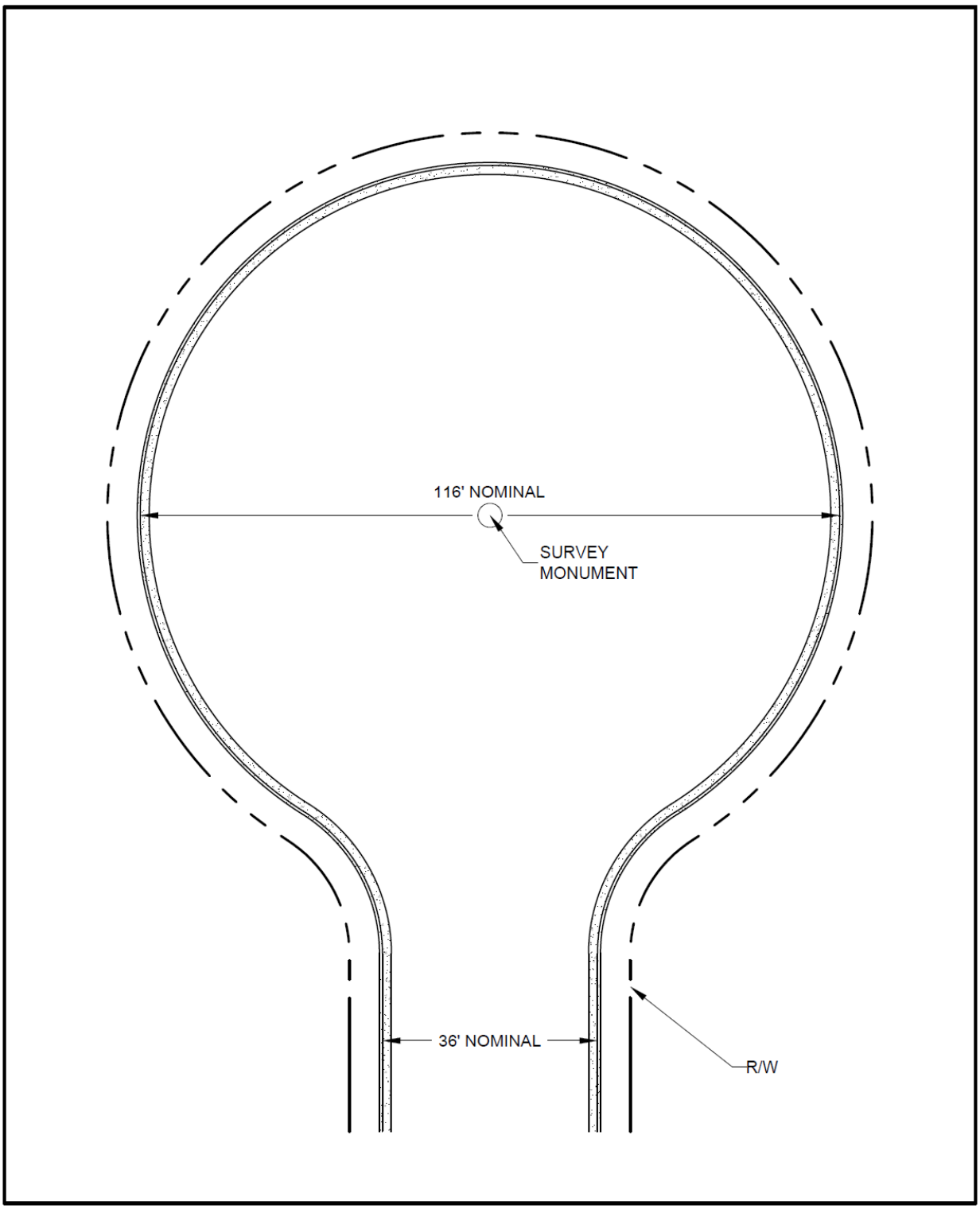


Figure D104.2(4)–Dead End Turnaround, 120-foot Hammerhead

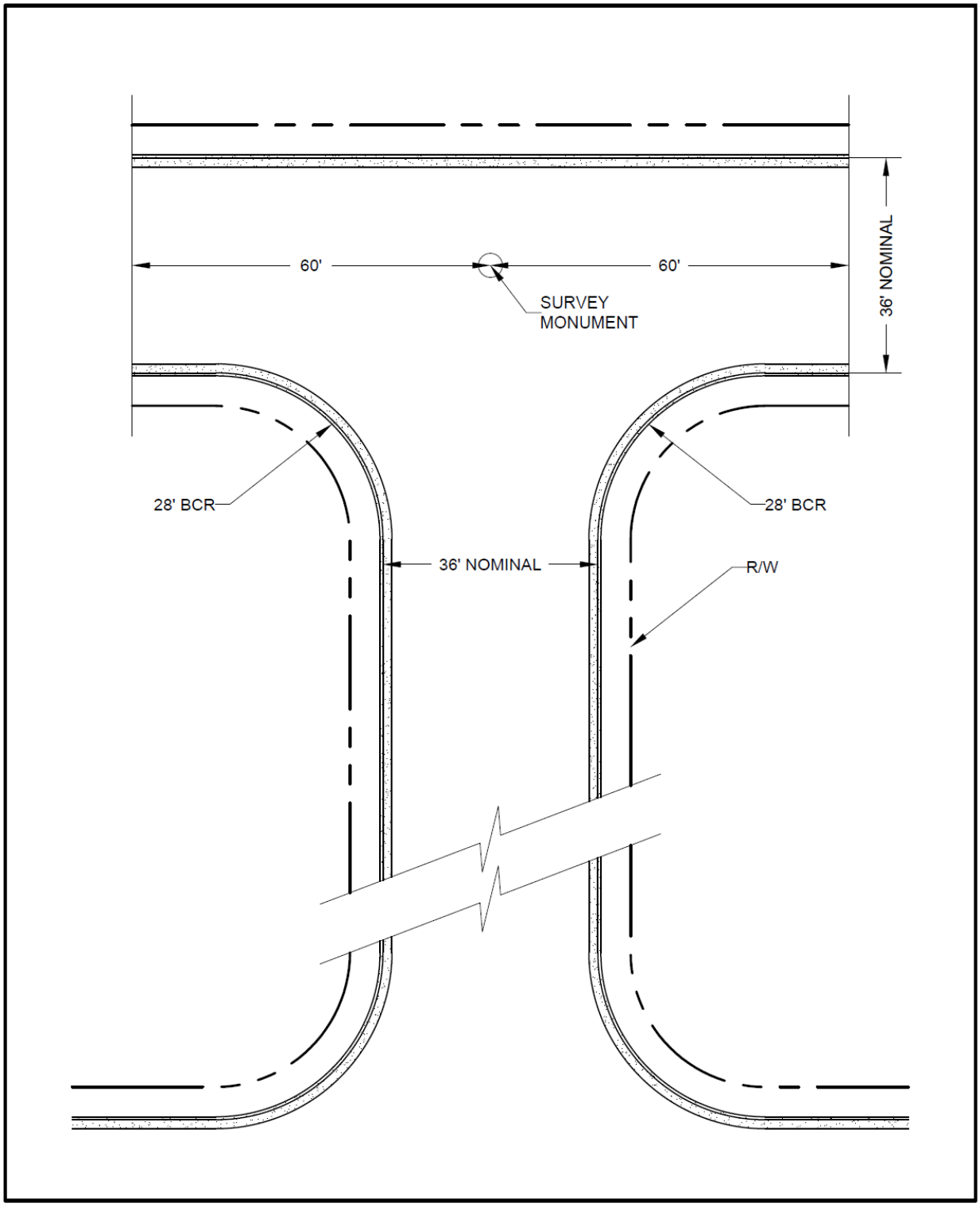


Figure D104.2(5)–Dead-End Turnaround, 70-foot Tee

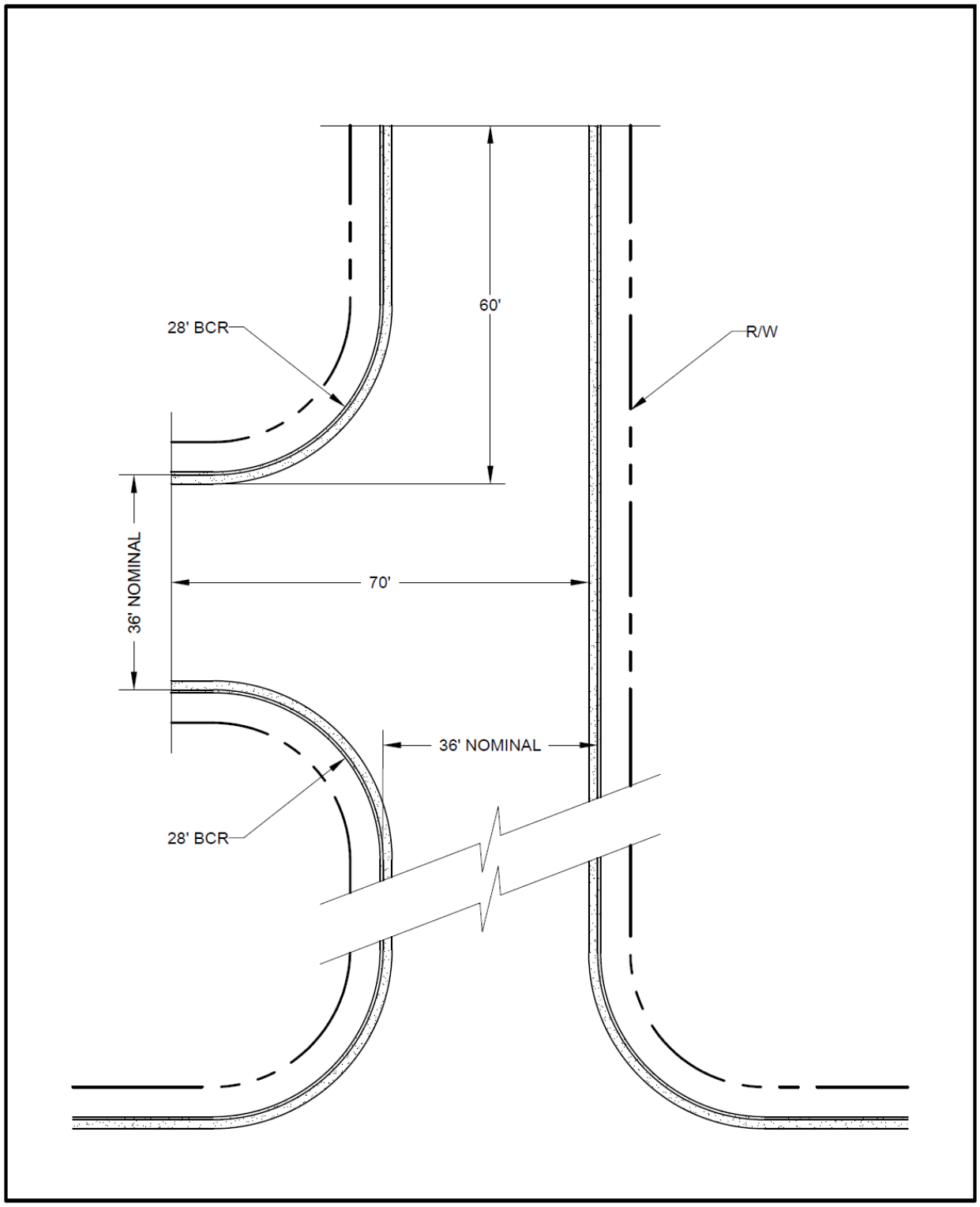
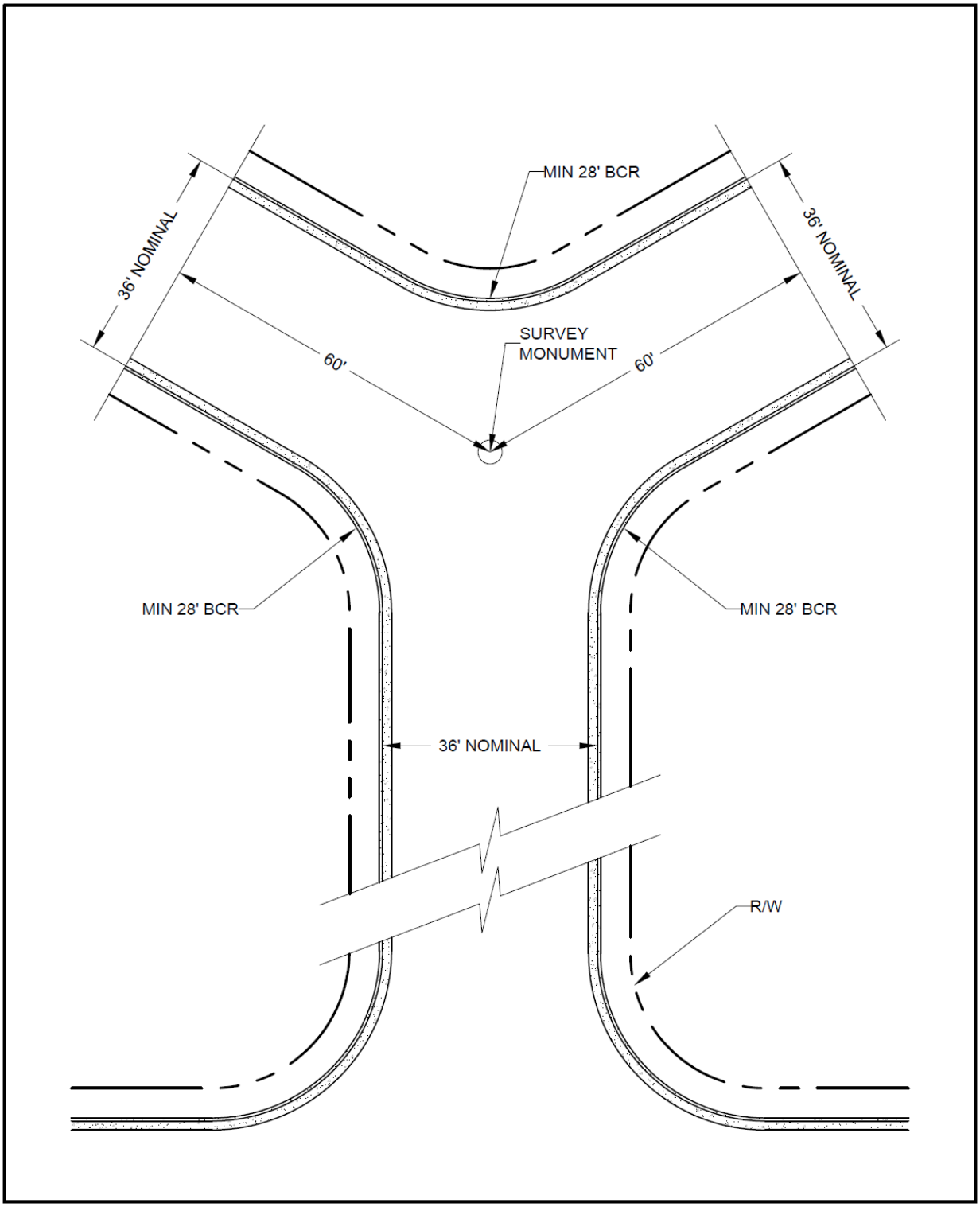


Figure D104.2(6)–Dead-End Turnaround, 60-foot Wye



Appendix P **PROPRIETARY SUPERVISING STATION FACILITIES**

SECTION P101—GENERAL

P101.1 Scope. Proprietary supervising station facilities (self-monitoring facilities) shall meet all of the requirements of this appendix.

P101.2 Permit required. The proprietary supervising station facility shall maintain an annual operational permit.

SECTION P102—SITE REQUIREMENTS

P102.1 Location. The proprietary supervising station shall be located in a property's *fire command center*, or other *approved* location.

P102.1.1 Equipment. The *approved* location shall have at a minimum the following items:

1. A fire alarm annunciator that has appropriate control capabilities.
2. An all-call microphone and all-call evacuation switch.
3. Switches that activate the evacuation message, the investigation message (if applicable), and the all-clear message for the active alarm zones.
4. A printer that is provided with a secondary power source such as an uninterruptible power supply or other *approved* means.
5. Copy of the *approved* SOP as required by Section P104.

P102.2 Retransmission means. Two means of retransmission shall be provided. The primary means of retransmission shall be a land-line telephone. The secondary means of retransmission shall be a dedicated cellular telephone.

SECTION P103—PERSONNEL

P103.1 Qualifications. Proprietary supervising stations shall be operated by trained personnel in constant attendance who are responsible to the *owner* of the protected property.

P103.1.1 Evidence of training. Annually the applicant shall certify in writing to *the fire code official* that all authorized personnel have received training in the recognition and proper handling of alarm signals. Evidence of annual training for each authorized personnel shall be provided when requested by the *fire code official*.

P103.2 Training. Operators shall be trained on a yearly basis either by the installing fire alarm contractor, by the fire alarm maintenance contractor, or by the manufacturer's representative of installed fire alarm system.

Documentation of annual training shall be kept on site and available upon request of the *fire code official*. Operators shall be trained on the following:

1. How to differentiate between a water flow alarm signal, a fire alarm signal, a fire supervisory signal, and a fire trouble signal.
2. The basic operations of the panel, including but not limited, to the following: signal acknowledgment, resetting of the fire alarm system, selection of evacuation zones, and activating of the evacuation, investigation (if applicable), and all-clear evacuation messaging.
3. The Standard Operating Procedures (SOP's) required by Section P104 for the facility.

P103.3 Number of personnel. At least two operators shall be on duty at all times. One of the two operators shall be permitted to be a runner.

P103.4 Coverage. Adequate staffing shall be provided for runners to survey the entire facility within three minutes when responding to either a water flow alarm signal or a fire alarm signal.

SECTION P104—STANDARD OPERATING PROCEDURES

P104.1 General. A Standard Operating Procedure (SOP) shall be submitted to the *fire code official* when applying for the required annual permit for proprietary supervising station facilities. The SOP shall outline procedures with regards to emergency procedures and the disposition of the alarm, supervisory, and trouble signals. The SOP shall include at a minimum the following items:

1. The number of operators that will be on duty at all times.
2. The location and the equipment found within the proprietary supervising station facility.
3. The facilities' procedures in handling alarm, supervisory, and trouble signals.

SECTION P105—DISPOSITION OF SIGNALS

P105.1 Alarm signals. Upon receipt of a fire alarm signal, the proprietary supervising station operator shall immediately dispatch a runner to the alarm location identified on the fire alarm control unit.

a. If the fire is verified, immediately activate the evacuation message on the fire alarm system and initiate notification procedures. See P103.4 for coverage requirements.
b. If the alarm is false, the fire alarm system shall be reset. If either an investigation message or an evacuation message has been activated, then sound an all-clear message.

P105.2 Supervisory signals. Upon receipt of a supervisory signal, the proprietary supervising station operator shall immediately dispatch a runner to the location identified on the fire alarm control unit, unless the supervisory conditions are promptly restored.

P105.3 Trouble signals. Upon receipt of trouble signals or other signals pertaining solely to matters of equipment maintenance of the fire alarm system, the proprietary supervising station operator shall immediately dispatch runner to the location identified on the fire alarm control unit, unless the trouble conditions are promptly restored.

SECTION P106—RECORDKEEPING

P106.1 Alarms. A written log of all fire alarm signals shall be maintained in the *fire command center* including:

1. The investigating person's name.
2. The device address.
3. The type of alarm.
4. The date and time of receipt of the fire alarm signals.
5. The cause and disposition of the fire alarm signals.

Appendix Q Fire protection systems impairments and systems out of service – SN

Appendix Q **FIRE PROTECTION SYSTEMS**

IMPAIRMENTS AND SYSTEMS OUT OF SERVICE

SECTION Q101–IMPAIRMENT PROCEDURES

Q101.1 General. In addition to the requirements of Section 901.7, alternative protection measures shall be provided in accordance with this Appendix. Tables Q102.1(a) through Q103.1(b) shall be used by the *impairment coordinator* to determine the alternative protection measures required.

Q101.2 Impairment coordinator procedures. For all impairments, both planned and emergency (unplanned), an *impairment coordinator* shall be designated per Section 901.7.1. An *impairment coordinator* is the person responsible for maintenance of a particular *fire protection system*. When an *impairment coordinator* is not designated the *owner* shall be considered the *impairment coordinator*.

The *impairment coordinator* is responsible for informing the *fire code official* as to the nature of the impairment and its status, coordinating necessary repairs, tagging systems per Section 901.7.2 & 901.7.3 and implementing required alternative protection measures.

For all planned impairments, the *impairment coordinator* shall engage licensed contractors to conduct work needed on the *fire protection systems*. For all emergency impairments, the *impairment coordinator* shall contact the appropriate fire sprinkler, fire alarm or other *fire protection system* maintenance contractor to initiate emergency service response.

Q101.3 Maintenance contractor procedures. The maintenance contractor shall assess the impairment and provide a time estimate for the repair (impairment duration). The *impairment coordinator* shall use this time estimate and Tables Q102.1(a) through Q103.1(b) to determine the appropriate actions to take. Where the impairment is discovered during maintenance activities, the maintenance contractor shall contact ownership to request an *impairment coordinator*. The maintenance contractor shall estimate the time required for repair and report the impairment in accordance with this section.

Q101.4 Impairment procedure tables. The *impairment coordinator* shall comply with impairment tables Tables Q102.1(a) through Q103.1(b). Alternative protection measures are categorized as:

1. Notifying fire dispatch.
2. Instituting a fire watch within the building area where fire protection is impaired.
3. Providing other alternative protection measures as determined by *the fire code official* on a case-by-case basis.

Q101.4.1 Notify dispatch. When required by Tables Q102.1(a) through Q103.1(b) the *impairment coordinator* shall notify the fire department dispatch center and *fire code official*.

Q101.4.2 Fire watch. When required by Tables Q102.1(a) through Q103.1(b) the *impairment coordinator* shall institute a fire watch within the building area where fire protection is impaired for the duration of the impairment.

Fire watch shall be in accordance with the *Fire Watch Guideline*. Fire watch personnel shall be provided at a rate of 1 person per 100,000 square feet (9290 m^2) of building area, over the entire area of the building affected by the impairment.

Fire watch personnel shall meet the following characteristics:

1. Be capable of walking the building continuously during the shift. The fire watch shall walk over all assigned floor areas, including all *exits* from the floor areas assigned. Where the fire watch needs to take a break, another fire watch person shall cover the area during the break.
2. Be equipped with a bullhorn, flashlight, and cellular phone.
3. Be capable of assisting employees and building occupants to evacuate the building in an emergency situation while utilizing the flashlight to illuminate the *means of egress*. This activity may be required within the assigned fire watch area, or in assistance to other fire watch personnel in other fire watch areas in the building.
4. Be capable of calling emergency services by dialing 911 in case of fire. Upon discovery of fire, fire watch personnel shall first call 911, and then advise all other fire watch personnel of the emergency in order to obtain their assistance in notifying and evacuating employees and building occupants.

Q101.4.3 Other measures. When determined necessary by the *fire code official*, on a case-by-case basis, the *impairment coordinator* may be required to implement additional protection measures. The measure(s) available to the *fire code official* include, but are not limited to, the following:

1. Fire department oversight of fire watch.
2. Manning of equipment, such as manual release buttons for deluge systems.
3. Discontinuance of hazardous activities, such as cooking, welding, and pyrotechnic displays.

4. Removing hazard from building, i.e. as removing an airplane from a hangar.
5. Have all fire doors and shutters closed.
6. Manually activate smoke control.
7. Shut down an elevator.
8. Unlock stair door locks.
9. Engine stand-by for supply to fire sprinkler/standpipe system.
10. Partial evacuation of building.
11. Full evacuation of building.

Any costs associated with providing alternative protection measures shall be borne by the building *owner*.

Q102 Impairment tables, use groups A, E, H, I and R – SN

SECTION Q102—IMPAIRMENT TABLES, USE GROUPS A, E, H, I AND R

Q102.1 Use groups A, E, H, I and R. Groups A, E, H, I and R occupancies are deemed a high risk due to the characteristics of these occupancies. As such, alternative protection measures are tailored on a case-by-case basis in order to manage the risk in these occupancies. The *impairment coordinator* shall use the following Tables Q102.1(a) and Q102.1(b) to address impairments to *fire protection systems*. When alternative protection measures are required by Tables Q102.1(a) and Q102.1(b) the *fire code official* shall be contacted.

TABLE Q102.1(a)–SUPPRESSION-BASED SYSEMS, USE GROUPS A, E, H, I and R

Impairment Description	Building/Location Height – Stories Above Grade	Estimated Repair Time	Fire Watch Req'd	Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3
Fire Pump (standalone)	1	≤3 hours	Y	N
		>3 hours	Y	Y
	2-5	≤2 hours	Y	N
		>2 hours	Y	Y
	6 or more	≤1 hour	Y	N
		>1 hour	Y	Y
Fire Pump (with backup fire pump)	1	≤10 hours	N	N
		>10 hours	N	Y
	2-5	≤6 hours	N	N
		>6 hours	N	Y
	6 or more	≤3 hours	N	N

TABLE Q102.1(a)–SUPPRESSION-BASED SYSEMS, USE GROUPS A, E, H, I and R				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Time**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
		>3 hours	N	Y
Feed Main/Standpipe Out of Service (does not affect sprinkler system supplies)	1	≤10 hours	N	N
		>10 hours	N	Y
	2-5	≤10 hours	N	N
		>10 hours	N	Y
	6 or more	≤6 hours	N	N
		>6 hours	N	Y
Feed Main/Standpipe Out of Service (interrupts supply to more than one sprinkler system)	1	≤3 hours	Y	N
		>3 hours	Y	Y
	2-5	≤2 hours	Y	N
		>2 hours	Y	Y
	6 or more	≤1 hour	Y	N
		>1 hour	Y	Y
Underground fire service main out of Service – redundant main and tank.	1	≤10 hours	N	N
		>10 hours	N	Y
	2-5	≤10 hours	N	N
		>10 hours	N	Y
	6 or more	≤6 hours	N	N
		>6 hours	N	Y
Underground Supply Out of Service (No secondary water supply)	1	≤3 hours	Y	N
		>3 hours	Y	Y
	2-5	≤2 hours	Y	N
		>2 hours	Y	Y
	6 or more	≤1 hour	Y	N
		>1 hour	Y	Y
	1	≤6 hours	N	N
		>6 hours	N	Y

TABLE Q102.1(a)–SUPPRESSION-BASED SYSEMS, USE GROUPS A, E, H, I and R				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Time**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
Underground Supply Out of Service (built-in secondary water supply)	2-5	≤4 hours	N	N
		>4 hours	N	Y
	6 or more	≤2 hours	N	N
		>2 hours	N	Y
Waterflow switch not functional (system still operational)	1	≤6 hours	N	N
		>6 hours	Y	N
	2-5	≤4 hours	N	N
		>4 hours	Y	N
	6 or more	≤2 hours	N	N
		>2 hours	Y	N
Sprinkler System Repair / Sprinkler System out of Service	1	≤6 hours	Y	N
		>6 hours	Y	Y
	2-5	≤4 hours	Y	N
		>4 hours	Y	Y
	6 or more	≤2 hours	Y	N
		>2 hours	Y	Y
Water Spray Fixed System (NFPA 15)	N/A	≤8 hours	N	N
		>8 hours	Y	Y
Foam-Water system	1	≤4 hours	N	N
		>4 hours	Y	Y
	2-5	≤4 hours	N	N
		>4 hours	Y	Y
	6 or more	≤4 hours	N	N
		>4 hours	Y	Y
Kitchen exhaust hood and duct extinguishing system	NA	≤2 hours	N	N
		>2 hours	Y	Y
	1	≤10 hours	N	N

TABLE Q102.1(a)–SUPPRESSION-BASED SYSEMS, USE GROUPS A, E, H, I and R				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Time**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
Clean-agent (with sprinkler system inside space		>10 hours	N	N
	2-5	≤10 hours	N	N
		>10 hours	N	N
	6 or more	≤6 hours	N	N
		>6 hours	N	N
Clean-agent (without sprinkler system inside space)	1	≤6 hours	Y	N
		>6 hours	Y	Y
	2-5	≤4 hours	Y	N
		>4 hours	Y	Y
	6 or more	≤2 hours	Y	N
		>2 hours	Y	Y
Water Storage Tank (including pools used as tanks) – with redundant water mains	1	≤10 hours	N	N
		>10 hours	N	N
	2-5	≤10 hours	N	N
		>10 hours	N	N
	6 or more	≤6 hours	N	N
		>6 hours	N	Y
Water Storage Tank (including pools used as tanks) – without redundant water mains and tank acts as a secondary supply only	1	≤10 hours	N	N
		>10 hours	N	Y
	2-5	≤6 hours	N	N
		>6 hours	N	Y
	6 or more	≤3 hours	N	N
		>3 hours	N	Y
Water Storage Tank (including pools used as tanks) – without redundant water mains and tank acts as a break tank for primary supply	1	≤3 hours	Y	N
		>3 hours	Y	Y
	2-5	≤2 hours	Y	N
		>2 hours	Y	Y

TABLE Q102.1(a)–SUPPRESSION-BASED SYSEMS, USE GROUPS A, E, H, I and R				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Time**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
	6 or more	≤1 hour	Y	N
		>1 hour	Y	Y
Obstructions in water supply – Lack of flushing/MIC	1	≤8 hours	N	N
		>8 hours	Y	Y
	2-5	≤6 hours	N	N
		>6 hours	Y	Y
	6 or more	≤4 hours	N	N
		>4 hours	Y	Y
Fire department access (fire hydrant, fire command center, fire pump and FDC access)	1	≤4 hours	N	N
		>4 hours	Y	Y
	2-5	≤4 hours	N	N
		>4 hours	Y	Y
	6 or more	≤4 hours	N	N
		>4 hours	Y	Y

TABLE Q102.1(b)–FIRE ALARM SYSTEMS, USE GROUPS A, E, H, I and R				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Timea**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
Main FACU Not Operational (No Stand-alone Nodes)	1	≤3 hours	Y	N
		>3 hours	Y	Y
	2-5	≤2 hours	Y	N
		>2 hours	Y	Y

TABLE Q102.1(b)–FIRE ALARM SYSTEMS, USE GROUPS A, E, H, I and R				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Timea**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
	6 or more	≤1 hour	Y	N
		>1 hour	Y	Y
Main FACU Not Operational (Stand-alone Nodes are available)	1	≤5 hours	Y	N
		>5 hours	Y	N
	2-5	≤5 hours	Y	N
		>5 hours	Y	N
	6 or more	≤3 hours	Y	N
		>3 hours	Y	Y
Node FACU panel is down	1	≤4 hours	Y	N
		>4 hours	Y	Y
	2-5	≤3 hours	Y	N
		>3 hours	Y	Y
	6 or more	≤2 hours	Y	N
		>2 hours	Y	Y
Strobe power supply is down	1	≤5 hours	N	N
		>5 hours	N	Y
	2-5	≤5 hours	N	N
		>5 hours	N	Y
	6 or more	≤3 hours	N	N
		>3 hours	N	Y
Audio panel is down	1	≤5 hours	Y	N
		>5 hours	Y	Y
	2-5	≤4 hours	Y	N
		>4 hours	Y	Y
	6 or more	≤3 hours	Y	N
		>3 hours	Y	Y
Single detection circuit is down	1	≤5 hours	N	N

TABLE Q102.1(b)–FIRE ALARM SYSTEMS, USE GROUPS A, E, H, I and R				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Timea**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
		>5 hours	Y	N
	2-5	≤5 hours	N	N
		>5 hours	Y	N
	6 or more	≤3 hours	Y	N
		>3 hours	Y	Y
Single notification circuit is down	1	≤5 hours	N	N
		>5 hours	Y	N
	2-5	≤5 hours	N	N
		>5 hours	Y	N
	6 or more	≤3 hours	Y	N
		>3 hours	Y	Y
Single detection device not operational	1	≤10 hours	N	N
		>10 hours	Y	N
	2-5	≤10 hours	N	N
		>10 hours	Y	N
	6 or more	≤10 hours	N	N
		>10 hours	Y	N
Single Notification Device not operational	1	≤10 hours	N	N
		>10 hours	Y	N
	2-5	≤10 hours	N	N
		>10 hours	Y	N
	6 or more	≤10 hours	N	N
		>10 hours	Y	N
Monitoring Panel not operational (fire sprinkler or fire alarm systems still operational)	1	≤12 hours	N	N
		>12 hours	Y	Y
	2-5	≤12 hours	N	N
		>12 hours	Y	Y

TABLE Q102.1(b)–FIRE ALARM SYSTEMS, USE GROUPS A, E, H, I and R				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Timea**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
	6 or more	≤12 hours	N	N
		>12 hours	Y	Y
Ground Fault	1	≤5 hours	N	N
		>5 hours	Y	N
	2-5	≤5 hours	N	N
		>5 hours	Y	N
	6 or more	≤5 hours	N	N
		>5 hours	Y	N
Single Notification Card in Panel	1	≤5 hours	Y	N
		>5 hours	Y	N
	2-5	≤5 hours	Y	N
		>5 hours	Y	Y
	6 or more	≤3 hours	Y	N
		>3 hours	Y	Y
Single Detection Card in Panel	1	≤5 hours	Y	N
		>5 hours	Y	N
	2-5	≤5 hours	Y	N
		>5 hours	Y	Y
	6 or more	≤3 hours	Y	N
		>3 hours	Y	Y
Recall	1	NA	NA	NA
	2-5	≤5 hours	N	N
		>5 hours	N	Y
	6 or more	≤5 hours	N	N
		>5 hours	N	Y
Automatic Doors not Releasing Automatically	1	≤2 hours	N	N
		>2 hours	N	Y

TABLE Q102.1(b)–FIRE ALARM SYSTEMS, USE GROUPS A, E, H, I and R				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Timea**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
	2-5	≤2 hours	N	N
		>2 hours	N	Y
	6 or more	≤2 hours	N	N
		>2 hours	N	Y
Smoke Control Panel (automatic mode works)	1	≤4 hours	N	N
		>4 hours	N	Y
	2-5	≤3 hours	N	N
		>3 hours	N	Y
	6 or more	≤2 hours	N	N
		>2 hours	N	Y
Smoke Control Panel (automatic mode does not work)	NA	NA	N	Y
Firefighter communication systems (fire phones and radio systems)	NA	NA	N	Y
a. If the building is protected with a fire sprinkler system, the "Estimated Repair Time" hours shown in this column may be doubled.				

Q103 Impairment tables, use groups B, M, F, and S – SN

SECTION Q103—IMPAIRMENT TABLES, USE GROUPS B, M, F, AND S

Q103.1 Use groups B, M, F, and S. Groups B, M, F, and S occupancies are considered lower hazard occupancies. The *impairment coordinator* shall use the following Tables Q103.1(a) and Q103.1(b) to address impairments to *fire protection systems*. When alternative protection measures are required by Tables Q103.1(a) and Q103.1(b), the *fire code official* shall be contacted.

Table Q103.1(a)–SUPPRESSION-BASED SYSTEMS, USE GROUPS B, F, M and S				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Time**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
Fire Pump	1	≤ 10 hours	Y	N
		>10 hours	Y	Y
	2-5	≤4 hours	Y	N
		>4 hours	Y	Y
	6 or more	≤2 hours	Y	N
		>2 hours	Y	Y
Fire Pump with back-up fire pump	1	≤ 10 hours	N	N
		>10 hours	N	Y
	2-5	≤10 hours	N	N
		>10 hours	N	Y
	6 or more	≤10 hours	N	N
		>10 hours	N	Y
Feed Main / Standpipe Out of Service (does not affect sprinkler system supplies)	1	≤ 10 hours	N	N
		>10 hours	N	Y
	2-5	≤10 hours	N	N
		>10 hours	N	Y
	6 or more	≤10 hours	N	N
		>10 hours	N	Y
Feed Main / Standpipe Out of Service (interrupts supply to more than one sprinkler system)	1	≤ 10 hours	Y	N
		>10 hours	Y	Y
	2-5	≤4 hours	Y	N
		>4 hours	Y	Y
	6 or more	≤2 hours	Y	N
		>2 hours	Y	Y
Underground fire service main out of service (No secondary water supply)	1	≤ 10 hours	Y	N
		>10 hours	Y	Y
	2-5	≤ 10 hours	Y	N

Table Q103.1(a)–SUPPRESSION-BASED SYSTEMS, USE GROUPS B, F, M and S				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Time**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
		>10 hours	Y	Y
	6 or more	≤2 hours	Y	N
		>2 hours	Y	Y
Underground Supply Out of Service (No secondary water supply)	1	≤ 10 hours	Y	N
		>10 hours	Y	Y
	2-5	≤10 hours	Y	N
		>10 hours	Y	Y
	6 or more	≤2 hours	Y	N
		>2 hours	Y	Y
Underground Supply Out of Service (built-in secondary water supply)	1	≤ 10 hours	N	N
		>10 hours	N	Y
	2-5	≤10 hours	N	N
		> 10 hours	N	Y
	6 or more	≤ 2 hours	N	N
		> 2 hours	N	Y
Waterflow switch not functional (system still operational)	1	≤ 10 hours	N	N
		> 10 hours	Y	N
	2-5	≤ 6 hours	N	N
		> 6 hours	Y	N
	6 or more	≤ 3 hours	N	N
		> 3 hours	Y	N
Sprinkler System Repair/ Sprinkler System out of Service	1	≤ 10 hours	Y	N
		> 10 hours	Y	Y
	2-5	≤ 6 hours	Y	N
		> 6 hours	Y	Y
	6 or more	≤ 3 hours	Y	N
		> 3 hours	Y	Y

Table Q103.1(a)–SUPPRESSION-BASED SYSTEMS, USE GROUPS B, F, M and S				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Time**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
Water Spray Fixed Systems (NFPA 15)	NA	≤ 8 hours	N	N
		> 8 hours	Y	Y
Foam-water system	1	≤ 4 hours	N	N
		> 4 hours	Y	Y
	2-5	≤ 4 hours	N	N
		> 4 hours	Y	Y
	6 or more	≤ 4 hours	N	N
		> 4 hours	Y	Y
Kitchen exhaust hood and duct extinguishing system	NA	≤ 2 hours	N	N
		> 2 hours	Y	Y
Clean-agent (with sprinkler system inside space)	1	≤ 10 hours	N	N
		>10 hours	N	N
	2-5	≤ 10 hours	N	N
		>10 hours	N	N
	6 or more	≤ 8 hours	N	N
		> 8 hours	Y	N
Clean-agent (without sprinkler system inside space)	1	≤ 8 hours	Y	N
		> 8 hours	Y	Y
	2-5	≤ 6 hours	Y	N
		> 6 hours	Y	Y
	6 or more	≤ 3 hours	Y	N
		> 3 hours	Y	Y
Water storage tank (including pools used as tanks) – with redundant water mains	1	≤ 10 hours	N	N
		> 10 hours	N	N
	2-5	≤ 10 hours	N	N
		> 10 hours	N	N
	6 or more	≤ 8 hours	N	N

Table Q103.1(a)–SUPPRESSION-BASED SYSTEMS, USE GROUPS B, F, M and S				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Time**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
	6 or more	> 8 hours	N	Y
Water storage tank (including pools used as tanks) – without redundant water mains and tank acts as a secondary supply only	1	≤ 10 hours	N	N
		>10 hours	N	Y
	2-5	≤ 6 hours	N	N
		> 6 hours	N	Y
	6 or more	≤ 3 hours	N	N
		> 3 hours	N	Y
Water storage tank (including pools used as tanks) – without redundant water mains and tank acts as a break tank for primary supply	1	≤ 8 hours	Y	N
		> 8 hours	Y	Y
	2-5	≤ 6 hours	Y	N
		> 6 hours	Y	Y
	6 or more	≤ 4 hours	Y	N
		> 4 hours	Y	Y
Obstructions in water supply – Lack of flushing/MIC	1	≤ 5 hours	N	N
		> 5 hours	Y	Y
	2-5	≤ 3 hours	N	N
		> 3 hours	Y	Y
	6 or more	≤ 1 hour	N	N
		> 1 hour	Y	Y
Fire department access (fire hydrant, fire command center, fire pump and FDC access)	1	≤ 4 hours	N	N
		> 4 hours	Y	Y
	2-5	≤ 4 hours	N	N
		> 4 hours	Y	Y
	6 or more	≤ 4 hours	N	N
		> 4 hours	Y	Y

TABLE Q103.1(b)–FIRE ALARM SYSTEMS, USE GROUPS B, F, M and S				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Time[a]**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
Main FACU Not Operational (No Stand-alone Nodes)	1	≤ 5 hours	Y	N
		> 5 hours	Y	Y
	2-5	≤ 2 hours	Y	N
		> 2 hours	Y	Y
	6 or more	≤ 1 hour	Y	N
		> 1 hour	Y	Y
Main FACU Not Operational (Stand-alone Nodes are available)	1	≤ 5 hours	Y	N
		> 5 hours	Y	N
	2-5	≤ 5 hours	Y	N
		> 5 hours	Y	N
	6 or more	≤ 5 hours	Y	N
		> 5 hours	Y	Y
Node FACU panel is down	1	≤ 5 hours	Y	N
		> 5 hours	Y	Y
	2-5	≤ 4 hours	Y	N
		> 4 hours	Y	Y
	6 or more	≤ 3 hours	Y	N
		> 3 hours	Y	Y
Strobe power supply is down	1	≤ 5 hours	N	N
		> 5 hours	N	Y
	2-5	≤ 5 hours	N	N
		> 5 hours	N	Y
	6 or more	≤ 5 hours	N	N
		> 5 hours	N	Y
Audio panel is down	1	≤ 5 hours	Y	N
		> 5 hours	Y	Y
	2-5	≤ 5 hours	Y	N

TABLE Q103.1(b)–FIRE ALARM SYSTEMS, USE GROUPS B, F, M and S				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Time[a]**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
		> 5 hours	Y	Y
	6 or more	≤ 4 hours	Y	N
		> 4 hours	Y	Y
Single detection circuit is down	1	≤ 5 hours	N	N
		> 5 hours	Y	N
	2-5	≤ 5 hours	N	N
		> 5 hours	Y	N
	6 or more	≤ 5 hours	Y	N
		> 5 hours	Y	Y
Single notification circuit is down	1	≤ 5 hours	N	N
		> 5 hours	Y	N
	2-5 2-5	≤ 5 hours	N	N
		> 5 hours	Y	N
	6 or more	≤ 5 hours	Y	N
		> 5 hours	Y	Y
Single detection device not operational	1	≤ 10 hours	N	N
		> 10 hours	Y	N
	2-5	≤ 10 hours	N	N
		> 10 hours	Y	N
	6 or more	≤ 10 hours	N	N
		> 10 hours	Y	N
Single Notification Device not operational	1	≤ 10 hours	N	N
		> 10 hours	Y	N
	2-5	≤ 10 hours	N	N
		> 10 hours	Y	N
	6 or more	≤ 10 hours	N	N
		> 10 hours	Y	N

TABLE Q103.1(b)–FIRE ALARM SYSTEMS, USE GROUPS B, F, M and S				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Time[a]**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
Monitoring Panel not operational (fire sprinkler or fire alarm systems still operational)	1	≤ 24 hours	N	N
		> 24 hours	Y	Y
	2-5	≤ 24 hours	N	N
		> 24 hours	Y	Y
	6 or more	≤ 24 hours	N	N
		> 24 hours	Y	Y
Ground Fault	1	≤ 10 hours	N	N
		> 10 hours	Y	N
	2-5	≤ 10 hours	N	N
		> 10 hours	Y	N
	6 or more	≤ 10 hours	N	N
		> 10 hours	Y	N
Single Notification Card in Panel	1	≤ 5 hours	Y	N
		> 5 hours	Y	N
	2-5	≤ 5 hours	Y	N
		> 5 hours	Y	Y
	6 or more	≤ 3 hours	Y	N
		> 3 hours	Y	Y
Single Detection Card in Panel	1	≤ 5 hours	Y	N
		> 5 hours	Y	N
	2-5	≤ 5 hours	Y	N
		> 5 hours	Y	Y
	6 or more	≤ 3 hours	Y	N
		> 3 hours	Y	Y
Recall	1	NA	NA	NA
	2-5	≤ 5 hours	N	N
		> 5 hours	N	Y

TABLE Q103.1(b)–FIRE ALARM SYSTEMS, USE GROUPS B, F, M and S				
Impairment Description	**Building/Location Height – Stories Above Grade**	**Estimated Repair Time[a]**	**Fire Watch Req'd**	**Fire Watch Notify Dispatch and *fire code official* for possible additional measures per section Q101.4.3**
	6 or more	≤ 3 hours	N	N
		> 3 hours	N	Y
Automatic Doors not Releasing Automatically	1	≤ 2 hours	N	N
		> 2 hours	N	Y
	2-5	≤ 2 hours	N	N
		> 2 hours	N	Y
	6 or more	≤ 2 hours	N	N
		> 2 hours	Y	Y
Smoke Control Panel (automatic mode works)	1	≤ 5 hours	N	N
		> 5 hours	N	Y
	2-5	≤ 5 hours	N	N
		> 5 hours	N	Y
	6 or more	≤ 3 hours	N	N
		> 3 hours	N	Y
Smoke Control Panel (automatic mode does not work)	NA	NA	N	Y
Firefighter communication systems (fire phones and radio systems)	NA	NA	N	Y

a. If the building is protected with a fire sprinkler system, the "Estimated Repair Time" hours shown in this column may be doubled.

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3.3.120 Limited-combustible material – SN

3.3.120* Limited-Combustible Material. Deleted in its entirety throughout this standard. This term shall have no ordinary accepted meaning as noted in Section 3.1 as it relates to the installation of limited-combustible material for the installation of sprinkler systems. This deletion shall apply throughout this standard and throughout all referenced codes and standards in the International Fire Code Section 102.7 and all applicable standards or requirements that are not set forth in this code as stated in the International Fire Code Section 102.8 when involving sprinkler systems.

4.3.3.2 Ordinary hazard (group 2) – SN

4.3.3.2* Ordinary Hazard (Group 2). The following shall be protected with OH2 occupancy criteria in this standard:

(1) Spaces or portions of other occupancies with moderate to high quantity and combustibility of contents

(2) Stockpiles of contents with moderate rates of heat release rate that do not exceed 12 ft (3.7 m) and stockpiles of contents with high rates of heat release that do not exceed 8 ft (2.4 m)

Occupancies containing Casinos, Mini-Storage Facilities, and Shell spaces, regardless of occupancy classification (unknown tenants and/or floor layout), shall be designed to meet the requirements of Ordinary Hazard Group 2.

4.3.8 Future storage – SN

4.3.8 Future Storage. In shell or spec group S1 occupancies, or storage areas of future or unknown use, the fire sprinkler system shall be designed to protect a class IV commodity to the maximum available storage height.

4.4.5 Multiple buildings, single sprinkler riser – SN

4.4.5 When acceptable to the authority having jurisdiction, multiple buildings that are assigned the same street address, without independent building numbers, and are attached by canopies, covered breezeways, common roofs, or a common wall(s) shall be permitted to be supplied by a single fire sprinkler riser.

4.4.7 Fire alarm notification zones – SN

4.4.7 Fire Alarm Notification Zones. Sprinkler systems serving a building with multiple fire alarm notification zones shall be defined by the same boundaries as the fire alarm notification zones. Sprinkler systems shall not cross over notification zone boundaries.

6.1.2 UG pipe pressure rating – CC

6.1.2* All piping used in private fire service mains shall be rated for the maximum system working pressure to which the piping is exposed to but shall not be rated for less than 150 psi (10.3 bar). When the underground piping can be supplied or pressurized by a fire pump or a fire department connection (FDC), the underground piping shall be designed to withstand a working pressure of not less than 200 psi (Class 305), or 50 psi greater than the FDC design pressure, whichever is greater. [**24**:10.1.2]

6.2.2 UG fitting pressure rating – CC

6.2.2 All fittings used in private fire service mains shall be rated for the maximum system working pressure to which the fittings are exposed, but shall not be rated for less than 150 psi (10.3 bar). When the underground piping can be supplied or pressurized by a fire pump or a fire department connection (FDC), the underground piping shall be designed to withstand a working pressure of not less than 200 psi (Class 305), or 50 psi greater than the FDC design pressure, whichever is greater.

7.1.2 Rated pressure – CC

7.1.2 Rated Pressure. System components shall be rated for the maximum system working pressure to which they are exposed but shall not be rated at less than 175 psi (12 bar) for components installed above ground and 150 psi (10 bar) for components installed underground. When the underground piping can be supplied or pressurized by a fire pump or a fire department connection (FDC), the underground piping shall be designed to withstand a working pressure of not less than 200 psi (Class 305), or 50 psi greater than the FDC design pressure, whichever is greater.

8.1.3 Auxiliary systems – SN

8.1.3 Auxiliary Systems. A wet pipe system shall be permitted to supply an auxiliary antifreeze, dry pipe, or preaction system provided the auxiliary system covers less than 10% of the allowable system size.

8.2.3.1 Dry system water delivery – SN

8.2.3.1* The system capacity (volume) controlled by a dry pipe valve shall be determined by 8.2.3.2, 8.2.3.5, or 8.2.3.7.

8.2.3.3 Dry system water delivery – SN

8.2.3.3* This section is deleted from NFPA 13.

8.2.3.4 Dry system water delivery – SN

8.2.3.4 This section is deleted from NFPA 13.

8.2.3.5 Dry system water delivery – SN

8.2.3.5 System size shall be based on dry pipe systems being calculated for water delivery in accordance with 8.2.3.6. Testing of the system shall be accomplished by the methods indicated in 8.2.3.7.

8.2.6.6.5.2 Dry system air compressor – SN

8.2.6.6.5.2 The air compressor shall be secured at all times.

8.2.6.7.2.3 Dry system supervision – SN

8.2.6.7.2.3 When a low or high air pressure condition is detected, notification shall be through the fire alarm control unit as a supervisory condition.

8.3.2.3.1.3 Double interlock preaction system water delivery – SN

8.3.2.3.1.3 The system size for double interlock preaction systems shall be based on calculating water delivery in accordance with 8.2.3.6, anticipating that the detection system activation and sprinkler operation will be simultaneous. A system meeting the requirements of this section shall be required to also meet the requirements of 8.2.3.7.

8.6.2.3 Antifreeze solution – SN

8.6.2.3 An antifreeze solution shall be prepared with a freezing point at or below 2º F (-16.7º C).

8.9.3.1 Duct sprinklers – SN

8.9.3.1 Unless the requirements of 8.9.3.2 or 8.9.3.4 are met, exhaust ducts shall have one sprinkler or automatic spray nozzle located at the top of each vertical riser, and at the midpoint of each offset, and an additional sprinkler shall be installed within the duct at 20-foot intervals on vertical risers where not otherwise provided with sprinklers due to offsets in buildings over two stories.

8.9.9 Dedicated supply and indicating valves – SN

8.9.9 Dedicated Supply and Indicating Valves. A dedicated supply riser, including flow switch, check valve, and a listed indicating valve shall be installed in the water supply line to the sprinklers and spray nozzles protecting the cooking and ventilating system.

9.2.1.12 Concealed spaces with exposed combustible surfaces – SN

9.2.1.12 This section is deleted from NFPA 13.

9.2.1.13 Concealed spaces with exposed FRTW – SN

9.2.1.13* This section is deleted from NFPA 13.

9.2.3.1 Exterior projections – SN

9.2.3.1* Sprinklers shall be permitted to be omitted where the exterior canopies, roofs, porte-cocheres, balconies, decks, and similar projections are constructed entirely with materials that are noncombustible, and where the exterior projections do not support occupancy above.

9.2.3.2 Exterior projections of combustible construction – SN

9.2.3.2 This section is deleted from NFPA 13.

9.2.4.1.1 Dwelling or sleeping unit bathrooms – SN

9.2.4.1.1* Sprinkler protection shall be provided in all bathrooms.

9.2.4.1.1.1 Dwelling or sleeping unit toilet rooms – SN

9.2.4.1.1.1 Sprinklers shall not be required in rooms that contain solely a toilet fixture, that contain no counters, shelving, closet doors, or other fixtures, that have a maximum area of 55 ft² (5.1m²), and that are not located under stairs that are part of the path of egress. Such rooms shall be surrounded by walls and doors that completely enclose the room.

9.2.5.1 Dwelling or sleeping unit toilet rooms – SN

9.2.5.1 Sprinkler protection shall be provided in clothes closets, linen closets, and pantries.

9.2.6 Electrical equipment rooms – SN

9.2.6* Electrical Equipment Rooms. This section is deleted from NFPA 13.

9.2.17 Drop-out ceilings – SN

9.2.17 Drop-Out Ceilings. This section is deleted from NFPA 13.

9.3.5.1 Water curtains for vertical openings – SN

9.3.5.1* General. Unless the requirements of 9.3.5.4 are met, where moving stairways, staircases, or similar floor openings are unenclosed and where sprinkler protection is serving as the alternative to enclosure of the vertical opening, the floor openings involved shall be protected by closely spaced sprinklers supplied by a dedicated sprinkler riser when required by the AHJ in combination with draft curtains in accordance with 9.3.5.2 and 9.3.5.3.

9.3.11.1 Drop out ceilings – SN

9.3.11.1* This section is deleted from NFPA 13.

9.3.11.2 Drop out ceilings – SN

9.3.11.2 This section is deleted from NFPA 13.

9.3.11.3 Drop out ceilings – SN

9.3.11.3 This section is deleted from NFPA 13.

9.3.11.4 Drop out ceilings – SN

9.3.11.4* This section is deleted from NFPA 13.

9.3.11.5 Drop out ceilings – SN

9.3.11.5* This section is deleted from NFPA 13.

9.3.19.1 Exterior projections – SN

9.3.19.1* Unless the requirements of 9.2.3.1, or 9.2.3.3 are met, sprinklers shall be installed under exterior projections exceeding 4' (1.2 m) in width.

9.3.22 Temporary exhibit booths within a permanent building – SN

9.3.22 Temporary Exhibit Booths within a Permanent Building. Where sprinkler protection is required in temporary exhibit booths constructed in a permanent building, such systems shall comply with Sections 9.3.22.1 to 9.3.22.5.

9.3.22.1 Hydraulic Design. Systems shall meet Density/Area Method requirements of Section 19.2.3.2 or the Pipe Schedule method of Section 28.5. The minimum design shall be for Ordinary Hazard Group 2, or higher design to accommodate the hazard within the temporary exhibit booth.

9.3.22.2 Bracing. Bracing shall not be required for temporary piping serving temporary exhibit booths.

9.3.22.3 Hangers. Hangers conforming to Section 17.1 shall be provided for temporary piping to temporary exhibit booths. Hangers shall be permitted to be attached to the temporary exhibit booth structure.

9.3.22.4 Exposed CPVC Piping. CPVC piping listed for fire protection service shall be permitted to be exposed when installed as temporary piping to serve temporary exhibit booths.

9.3.22.5 Valve. A valve and open pipe shall be provided from the most hydraulically remote point to allow for inspection of piping to prove that the piping is charged with water and void of trapped air.

9.3.23 Openings in rated assemblies – SN

9.3.23 Openings in Rated Assemblies. When sprinkler protection is serving as the alternative to required opening protectives in rated assemblies, such sprinklers shall be listed for use and installed in accordance with their listing. When required by the authority having jurisdiction, these sprinklers shall be supplied by a dedicated sprinkler system, controlled, monitored, and supplied independently of the overhead system(s).

9.3.24 Thin combustible membrane ceilings – CC

9.3.24 Thin Combustible Membrane Ceilings. The installation of sprinkler protection under a thin combustible membrane ceiling shall be accompanied by an approved Alternate Methods and Materials Report.

9.3.25 Self-storage – CC

9.3.25 Self-storage.

9.3.25.1 No less than one head per unit shall be installed.

9.3.25.2 Sprinklers shall be permitted to cover adjacent units when all of the following conditions are met:

(1) Mechanical means are provided over the entire area to limit storage height.

(2) Top of wall to adjacent units shall be no less than 18” vertically from bottom of deflector.

(3) Opening between units shall comply with the definition of unobstructed construction, 3.3.43.2.

(4) Sprinklers shall comply with sections 10.2.7, 10.3.6, 11.2.5, or 11.3.6.

(5) Any manufacturer requirements not otherwise covered under prescribed code have been addressed.

9.4.3.1 Thermal response requirements – SN

9.4.3.1 Sprinklers in light hazard occupancies, shell buildings of combustible construction, casinos, and exhibition areas shall be one of the following:

(1) Quick-response type as defined in 3.3.215.4.16

(2) Residential sprinklers in accordance with the requirements of Chapter 12

(3) Quick response CMSA sprinklers

(4) ESFR sprinklers

(5) Standard-response sprinklers used for modifications or additions, within the existing compartment, to existing systems equipped with standard-response sprinklers

(6) Standard-response sprinklers used where individual standard-response sprinklers are replaced in existing systems

9.4.4.2 Light hazard minimum k-factor – CC

9.4.4.2 For light hazard occupancy compartments of 148 ft^2 (4.5 m^2) or less not requiring as much water as is discharged by a sprinkler with a nominal K-factor of K-5.6 (80) operating at 7 psi (0.5 bar), sprinklers having a nominal K-factor smaller than K-5.6 (80) shall be permitted, subject to the following restrictions:

(1) The system shall be hydraulically calculated.

(2) Sprinklers with nominal K-factors of less than K-5.6 (80) shall be installed only in wet pipe sprinkler systems or in accordance with limitations of 9.4.4.3 or 9.4.4.4.

(3) A listed strainer shall be provided on the supply side of sprinklers with nominal K-factors of less than K-2.8 (40)

9.5.5.3.1.6 Residential garage doors, general – SN

9.5.5.3.1.6 Sprinklers shall not be required under overhead garage doors within garages that service a single tenant in residential occupancies.

10.2.7.4.2.1 Residential garage doors, standard spray – SN

10.2.7.4.2.1 Sprinklers shall not be required under overhead garage doors within garages that service a single tenant in residential occupancies.

10.2.7.4.6 Adjacent obstructions, standard spray – CC

10.2.7.4.6 For ducts, pipes, conduits, or groups of ducts, pipes and conduit to be considered individual, they shall be separated from the closest adjacent duct, pipe, conduit, cable tray, or similar obstructions by a minimum width equal to the adjacent duct, pipe, conduit, cable tray, or similar obstruction.

10.3.6.3.2.1 Residential garage doors, standard sidewall – SN

10.3.6.3.2.1 Sprinklers shall not be required under overhead garage doors within garages that service a single tenant in residential occupancies.

10.3.6.3.3 Adjacent obstructions, standard sidewall – CC

10.3.6.3.3 For ducts, pipes, conduits, or groups of ducts, pipes and conduit to be considered individual, they shall be separated from the closest adjacent duct, pipe, conduit, cable tray, or similar obstructions by a minimum width equal to the adjacent duct, pipe, conduit, cable tray, or similar obstruction.

11.2.5.3.2.1 Residential garage doors, EC spray – SN

11.2.5.3.2.1 Sprinklers shall not be required under overhead garage doors within garages that service a single tenant in residential occupancies.

11.2.5.3.6 Adjacent obstructions, EC spray – CC

11.2.5.3.6 For ducts, pipes, conduits, or groups of ducts, pipes and conduit to be considered individual, they shall be separated from the closest adjacent duct, pipe, conduit, cable tray, or similar obstructions by a minimum of two times the width of the adjacent duct, pipe, conduit, cable tray, or similar obstruction.

11.3.6.3.2.1 Residential garage doors, EC sidewall – SN

11.3.6.3.2.1 Sprinklers shall not be required under overhead garage doors within garages that service a single tenant in residential occupancies.

11.3.6.3.4 Adjacent obstructions, EC sidewall – CC

11.3.6.3.4 For ducts, pipes, conduits, or groups of ducts, pipes and conduit to be considered individual, they shall be separated from the closest adjacent duct, pipe, conduit, cable tray, or similar obstructions by a minimum of two times the width of the adjacent duct, pipe, conduit, cable tray, or similar obstruction.

13.2.8.3.6 Adjacent obstructions, CMSA – CC

13.2.8.3.6 For ducts, pipes, conduits, or groups of ducts, pipes and conduit to be considered individual, they shall be separated from the closest adjacent duct, pipe, conduit, cable tray, or similar obstructions by a minimum of three times the width of the adjacent duct, pipe, conduit, cable tray, or similar obstruction.

16.2.7.7 Head box list – SN

16.2.7.7 A list of the sprinklers installed in the property shall be posted in the sprinkler cabinet. The list shall be on a machine-engraved metal or rigid plastic sign with capitalized lettering having a minimum 14-point (1/4 inch high) Arial or similar font or as approved by the AHJ.

16.4.2.2 Corrosion resistance ratio – CC

16.4.2.2 Piping shall have a minimum corrosion resistance ratio (CRR) of 1. Where water supplies or environmental conditions are known to have unusual corrosive properties, the system shall be treated in accordance with 5.1.4.

16.9.3.3.1 Supervision of valves – SN

16.9.3.3.1 Valves on connections to water supplies, sectional control and isolation valves, and other valves in supply pipes to sprinkler and other fixed water-based fire suppression systems shall be electrically supervised by a central station, proprietary, or remote station signaling service.

16.9.3.3.2 Supervision of valves in high-rise buildings – SN

16.9.3.3.2 Floor control valves in high-rise buildings shall comply with 16.9.3.3.1.

16.9.3.3.3 Supervision of street valves & backflows – SN

16.9.3.3.3 The requirements of 16.9.3.3.1 shall not apply to underground gate valves with roadway boxes or to valves at backflow prevention devices at the municipal water supply connection where the valves are locked in the open position.

16.9.7.1 Sprinkler system PRV set pressure – CC

16.9.7.1 In portions of systems where the potential exist for normal (nonfire condition) water pressure in excess of 175 psi (12 bar) and all components are not listed for pressures equal to or greater than the maximum potential water pressure, a listed pressure-reducing valve shall be installed and set for an outlet pressure not exceeding the minimum rated pressure of any component within that portion of the system at the maximum inlet pressure.

16.9.7.3 Sprinkler system PRV relief valve set pressure – SN

16.9.7.3* A listed relief valve of not less than ½ in. (15 mm) in size shall be provided on the discharge side of the pressure-reducing valve set to operate at a pressure 10psi greater than the pressure setting of the pressure-reducing valve.

16.9.10.1 Systems in multistory buildings – SN

16.9.10.1 Multistory buildings shall be provided with a floor control valve, check valve, pressure gauge, main drain valve, and flow switch for isolation, control, and annunciation of water flow on each floor level.

16.9.10.2 Systems in areas with nonstandard ceiling heights – SN

16.9.10.2 The floor control valve, check valve, pressure gauge, main drain valve, and flow switch required by 16.9.10.1 shall not be required where sprinkler systems protecting atriums, covered mall buildings, and other areas with non-standard ceiling heights within the building are supplied by piping from the protected floor system below.

16.9.10.3 Systems in small footprint buildings – SN

16.9.10.3 This section is deleted from NFPA 13.

16.11.2.1 Local waterflow alarms – SN

16.11.2.1 Local Waterflow Alarms. A local waterflow alarm shall be provided on every sprinkler system.

18.6.7 Restraint of drops – CC

18.6.7 Drops less than 10 feet (3048 mm), as measured vertically, shall not require restraint. Drops of 10 feet (3048 mm) or longer, as measured vertically, shall require restraint. Horizontal portions of the pipe shall not be included when measuring pipe length to determine that restraint is required. Restraint may consist of wire wrap tied to any structural element, including ceiling tile grid, or any manner permitted by the authority having jurisdiction. Drops of 10 feet (3048 mm) or longer attached to flexible connections shall not require an additional restraint when the mounting bracket complies with ICC-ES AC-156 Seismic Qualification Testing of Nonstructural Components. Armovers of any horizontal length shall not require restraint.

19.3.1.1 Residential design areas – CC

19.3.1.1 The design area shall be in accordance with either 19.2.3.2 or 19.3.1.1.1.

19.5 Non-storage occupancies with high ceilings – SN

19.5 Non-Storage Occupancies with High Ceilings. Non-storage occupancies with ceiling heights in excess of 25’ shall comply with Section 19.5 or an acceptable FM design. Where an FM design is used, all associated FM data sheets shall be complied with. For design criteria for Exhibition Spaces and Stages with Fly Galleries, see Section 19.6.

19.5.1 Light and Ordinary Hazard Group 1 and 2 Occupancies with Ceiling Heights between 25 and 50 feet. Light and Ordinary Hazard 1 and 2 occupancies shall be designed to provide a minimum density of 0.10 gpm/ft2, 0.15 gpm/ft2 and 0.20 gpm/ft2 respectively. The minimum design area shall be equal to the ceiling height times 100. The sprinkler system shall utilize listed quick response sprinklers with a K-factor of 11.2 or greater. The maximum sprinkler discharge pressure allowed is 30 psi.

19.5.2 Non-Storage Occupancies with Ceiling Heights over 50 feet. All structures, regardless of occupancy or hazard classification, with ceiling heights exceeding 50'-0", require a design analysis from a licensed Fire Protection Engineer. This analysis must be submitted to the authority having jurisdiction for review and approval prior to the start of construction. Deluge systems shall be installed using sprinklers with a minimum k-factor of 11.2 with a maximum sprinkler discharge pressure of 30 psi.

19.5.3 Extra Hazard Occupancies with Ceiling Heights over 25 feet. Extra Hazard occupancies with ceiling heights over 25 feet require a design analysis from a licensed Fire Protection Engineer. This analysis must be submitted to the authority having jurisdiction for review and approval prior to the start of construction.

19.6 Sprinkler protection for exhibition spaces and stages with fly galleries – SN

19.6 Sprinkler Protection for Exhibition Spaces and Stages with Fly Galleries. Sprinkler protection for exhibition spaces and stages with fly galleries shall comply with Section 19.6 or an acceptable FM design. Where an FM design is used, all associated FM data sheets shall be complied with.

19.6.1 Exhibition Spaces and Stages with Fly Galleries with Ceiling Heights up to 35 feet. Sprinkler systems protecting exhibition spaces and stages with fly galleries with ceiling heights up to 35 feet shall be designed to provide a minimum density of 0.30 gpm/ft2. The minimum design area shall be 2,500 square feet. The sprinkler system shall utilize standard coverage quick response sprinklers with a k-factor of 8.0 or greater. The maximum sprinkler discharge pressure allowed is 30 psi. A hose stream demand of 500 gpm shall be provided.

19.6.2 Exhibition Spaces and Stages with Fly Galleries with Ceiling Heights between 35 and 60 feet. Sprinkler systems protecting exhibition spaces and stages with fly galleries with ceiling heights between 35 and 60 feet shall be designed to provide a minimum density of 0.45 gpm/ft2. The minimum design area shall be 2,500 square feet. The sprinkler system shall utilize standard coverage quick response sprinklers with a k-factor of 11.2 or greater. The maximum sprinkler discharge pressure allowed is 30 psi. A hose stream demand of 500 gpm shall be provided.

19.6.3 Exhibition Spaces and Stages with Fly Galleries with Ceiling Heights over 60 feet. Exhibition spaces and stages with fly galleries with ceiling heights exceeding 60'-0" require a design analysis from a licensed Fire Protection Engineer. This analysis must be submitted to the authority having jurisdiction for review and approval prior to the start of construction. Deluge systems shall be installed using standard coverage sprinklers with a minimum k-factor of 11.2 with a maximum sprinkler discharge pressure of 30 psi. A hose stream of 500 gpm shall be provided.

27.17.1 Chute sprinkler supply – SN

27.17.1 Chute Sprinkler Supply. Sprinklers serving chutes shall be on separate dedicated supply risers.

28.1.3 Working plans – CC

28.1.3 Working plans shall be drawn to an indicated scale, on sheets of uniform size, with a plan of each floor, and shall show, at minimum, those items from the following list that pertain to the design of the system:

(1) Name and address of building being protected

(2) Name, telephone number, and address of installing contractor

(3) Point of compass and graphic scale indications on drawings and details as applicable

(4) Location of all partitions that extend to or are within a minimum of 18 in. (450 mm) to the finished ceiling or exposed deck above

(5) Location of all fire-rated partitions, fire barriers, draft stops, and draft curtains

(6) Identification of all rooms and spaces, regardless of occupancy or use

(7) Identification and labeling of all spaces, above and below ceilings, where sprinklers will be omitted, including appropriate citation of the section(s) of this standard for such omission(s)

(8) Location of all fixtures, diffusers, lights, and devices installed in or mounted to the ceiling structure, regardless of the ceiling type (i.e., finished or exposed to structure)

(9) Label finished or exposed ceiling heights for each space, including those that are sloped greater than 2 in 12 (16.7 percent)

(10) Location and identification of major mechanical, plumbing, and electrical equipment installed above or below the ceiling spaces if sprinkler protection is being provided for those areas

(11) Location and identification of all major structural members, and identification and labeling of construction types (i.e., obstructed or unobstructed) for each space or portion thereof in the building, as applicable

(12) Location and identification of concealed spaces, regardless of combustibility, and of architectural and/or structural features not shown or easily identifiable in the floor plan or reflected ceiling plan views

(13) Water source(s) supply information, including the following:

(a) Location

(b) Type

(c) Size

(d) Dimensions

(e) Capacity

(f) Configuration

(g) Elevation

(h) Static pressure

(i) Flow rate

(j) Residual pressure

(k) Flow test locations, dates, and sources (i.e., city or private)

(l) Any adjustments from the raw data required by the engineer of record (i.e., owner's certificate) or the water authority, if applicable

(m) Size of city main in street and whether dead end or circulating; if dead end, direction and distance to nearest circulating main; and city main test results and system elevation relative to test hydrant

(n) Private fire service main sizes, lengths, locations, weights, materials, point of connection to city main; the sizes, types, and locations of valves, valve indicators, regulators, meters, and valve pits; and the depth that the top of the pipe is laid below grade

(14) Information from the owner's certificate required by Section 4.2, including the edition of this standard being used

(15) Identification and labeling of design criteria for each room and/or space as shown on building plan, including the following:

(a) Hazard classification associated with each room or space

(b) Identification and location of all rooms and spaces intended for storage, including the following:

i. Commodity classification

ii. Storage type and configuration

iii. Height of storage for each dedicated room or space

iv. Type of packaging to be used

(16) Identification and labeling of all sprinkler systems, including type and overall area protected by each system

(17) Location and labeling for the size, dimension, elevation, and type of all major sprinkler system components, including the following (*see 28.1.3.1*):

(a) Pipe, fittings, valves, and test and drain locations

(b) Sprinkler legend, per system, including the following:

i. Orientation

ii. Finish

iii. Manufacturer

iv. Model

v. SIN number

vi. K-factor

vii. Temperature rating

viii. Response type

ix. Quantity of each

x. If extended coverage or residential type, spacing utilized for this application

(c) Manufacturer, model, length, maximum number of bends, and minimum bend radius and corresponding K-factor applied to flexible sprinkler hose

(18) Location and labeling of all system flushing, forward flow, water flow alarm, and test and drain locations

(19) Location and labeling of sprinkler system riser(s) and, if applicable, standpipe location(s)

(20) Location and labeling of fire department connections

(21) Location and labeling of hydraulic calculation information, including the following:

(a) Graphic indication of each area of operation, including a description of any allowed density or area modifications applied

(b) Labeling of all node locations that correspond to each hydraulic calculation

(22) Location and labeling of seismic system components, including the following:

(a) Zones of influence

(b) Bracing and restraint assemblies

(c) Flexible couplings and penetration clearances

(d) Maximum spacing of components

(e) Design angle category(ies)

(23) Sprinkler system details and information for other system components necessary for the complete installation, including the following:

(a) Hanger and/or hanger assemblies intended to be used throughout

(b) Total system volume and set pressures for dry and preaction systems

(c) Hydraulic calculation summary information, including the following:

i. Method of calculation

ii. Total water and pressure required

iii. Hose demand

(d) Special information, settings, or values required for ongoing inspection, testing, and maintenance and system use, including the following:

i. Pressure regulating device features, settings, and means for conducting a flow test

ii. Dry pipe, preaction, and/or deluge systems

iii. Location of all low point drains

iv. Information regarding antifreeze solution used

(24) Full height cross section or schematic diagram, including structural member information as required for clarity and including ceiling construction and method of protection for nonmetallic piping

(25) A “Fire Department General Notes” note block shall be provided on the cover page and shall include, at minimum, the following information:

(a) **Scope of Work Narrative:** Provide a narrative describing the proposed scope of work. Within the narrative, state where sprinklers are being provided and for what purpose

(b) **Construction Information:** State the following related to the construction of the building:

i. State the NFPA 13 construction type (combustible or noncombustible) and classification (obstructed or unobstructed) for all areas within the scope of work

ii. State whether there are any combustible concealed spaces. Where combustible concealed spaces exist, list each space and associated method of protection or allowable omission

iii. State the ceiling flatness and material for all areas within the scope. For each area, state whether ceilings are horizontal, flat, sloped, has soffits, and other variations in ceiling height. For all instances of soffits and other variations of ceiling height, provide references to details provided on the working plans for each instance. State any instances of ceiling materials consisting of thin combustible membranes, such as stretch plastic or fabric. Any installation under a thin combustible membrane shall be accompanied by an approved engineering analysis

(c) **Occupancy Hazards:** State the scope’s general description of use. State the NFPA 13 occupancy hazard classification for each area within the scope of work

(d) **Storage Hazards:** State whether any storage hazards exist within the scope of work. This includes low piled and miscellaneous storage in accordance with Chapter 4. Where storage hazards exist and for each storage hazard, state the commodities, commodity classification, storage height, ceiling height, storage configuration (open rack, solid shelf, palletized, etc), aisle width as applicable, encapsulation, pallet material, and all other information required to fully support the protection criteria chosen

(e) **Devices and Materials:** State the following:

i. Manufacturer, schedule, and type of main piping

ii. Manufacturer, schedule, and type of branch line piping

iii. Indicate the manufacturer, schedule, and type of fittings and couplings

iv. Indicate the manufacturer, schedule, and type of underground piping

v. Indicate the manufacturer, model number and type of water meter assembly

(f) **Design Information:** State the following:

i. For all areas in the scope of work, state the type of freeze protection provided (i.e. building heated to 40°F at all times, dry system, etc.)

ii. State the maximum system pressure for each riser/system, and state the minimum pressure required for the hydrostatic test of each riser/system

iii. State the maximum sprinkler deflector distances below the roof deck for each area within the scope of work

iv. State the location of the sprinkler head box, and state that the room where the box is located is conditioned to 100°F or less

(26) Details of all signage required, including FDC sign(s), Hydraulic Design Information Sign(s), and General Information Sign(s)

(27) Additional items as required by the authority having jurisdiction

28.2.1.7 10psi safety margin – SN

28.2.1.7 Hydraulically calculated fire sprinkler systems shall be designed to ensure the required system pressure is a minimum of ten (10) psi below the available supply pressure.

28.2.1.8 Maximum water velocity – SN

28.2.1.8 The maximum velocity for use in hydraulic calculations shall be 32 ft/sec (9.8 m/sec).

29.4.1 Hydraulic placard – SN

29.4.1 The installing contractor shall identify a hydraulically designed sprinkler system with a machine-engraved weatherproof metal or rigid plastic sign with capitalized lettering a minimum 14 point (1/4 inch high) in Arial or similar font secured to the riser it serves with corrosion-resistant wire, chain, or other approved means. Signs located at the system control riser shall be allowed to be combined with the General Information Sign described in 29.6.

29.6.1.1 General information placard – SN

29.6.1.1 Such general information shall be provided with a machine-engraved weatherproof metal or rigid plastic sign with capitalized lettering a minimum 14 point (1/4 inch high) in Arial or similar font, secured with corrosion-resistant wire, chain, or other acceptable means.

30.2.5 Corrosion resistance ratio, system modifications – CC

30.2.5 Where a scope of work includes the removal, replacement, or relocation of existing piping with a corrosion resistance ratio (CRR) of less than 1, such piping shall be removed and replaced with piping with a minimum CRR of 1.

30.6.2 Calculations for system modifications – CC

30.6.2 Calculations shall be provided for revamped portions of systems to verify that the system design flow rate will be achieved unless provided for in sections 30.6.2.1 through 30.6.2.4.2 and where not specifically required by the authority having jurisdiction.

30.6.2.1 Calculations are not required where a one-inch outlet supplies one sprinkler providing protection below a ceiling and, if necessary, one sprinkler providing protection above a ceiling, provided such sprinkler(s) have a k-factor equal to the k-factor of the overhead sprinklers.

30.6.2.2 Calculations are not required where a one-inch outlet supplies a maximum of two sprinklers where the two sprinklers protect areas that are physically separated by a ceiling, walls and/or doors with a minimum lintel depth of 8 in (203 mm) and maximum total area of door openings into the room of 50 ft^2 (4.6 m^2). The sprinklers shall have a k-factor equal to the k-factor of the existing overhead sprinklers.

30.6.2.3 Calculations are not required where sprinklers installed under a ceiling have a k-factor less than the overhead sprinklers, provided the occupancy hazard classification for the area under the ceiling is less than the classification that the overhead sprinklers are designed for.

30.6.2.4 Flexible sprinkler hose shall be proven by hydraulic calculations.

30.6.2.4.1 Calculations are not required when flexible sprinkler hose has previously been proven by hydraulic calculations using current specifications.

30.6.2.4.2 Calculations are not required for listed sprinkler assemblies with integral flexible hose where the assembly is listed with zero equivalent length loss.

3.3.13.5 Passive purge sprinkler system definition – SN

3.3.13.5* ***Passive Purge Sprinkler System.*** A type of sprinkler system that serves one or more toilets in addition to the fire sprinklers.

4.4 Documentation – SN

4.4* Documentation. Documentation shall be provided to demonstrate that the water supply, listed devices, and sprinkler coverage comply with the requirements of this standard. Working plans shall be drawn to an indicated scale, on sheets of uniform size, with a plan of each floor, and shall show those items from the following list that pertain to the design of the system:

(1) Name of owner or developer.

(2) Location, including street address or lot number.

(3) Point of compass.

(4) Full height cross section.

(5) Ceiling/roof heights and slopes not shown in the full height cross section.

(6) Location of partitions, lintels, and doorways. Lintel openings require a cross section view to indicate the area of the opening.

(7) Name and label for each area or room.

(8) For systems supplied by city mains, location, and size of city main in street, and location, size, and type of domestic line, including length to city connection, and water meter location and size.

(9) Location of Static and residual hydrants that were used in flow tests shall be shown.

(10) If required, the location of the domestic GPM demand indicated.

(11) Make, type, model, temperature rating, nominal K-factor, and number of each type of sprinkler, including sprinkler identification number.

(12) Pipe type and schedule of wall thickness.

(13) Nominal pipe size and cutting lengths of pipe (or center-to-center dimensions).

(14) Location and size of riser nipples and drops.

(15) Type of fittings and joints.

(16) Type and locations of hangers, and methods of securing sprinklers when applicable.

(17) Location and size of all valves and drainpipes.

(18) Location and size of water gauges.

(19) Where the equipment is to be installed as an addition to an existing system, enough of the existing system indicated on the plans to make all conditions clear.

(20) A summary of the hydraulics, including the static pressure, residual pressure, and flow of the water supply, safety margin, the pressure and flow demands at the point of connection to the water supply, and the pressure and flow demands at the bottom of the system riser.

(21) Hydraulic reference points shown on the plan that correspond with comparable reference points on the hydraulic calculation sheets.

(22) Relative elevations of sprinklers, junction points, and supply or reference points.

(23) A graphic representation of the scale used on all plans.

(24) Name, address, phone number, and contractor's license number of contractor.

(25) Nevada State Fire Marshal registration number.

(26) Signature and NICET number, or engineer's seal, of the designer.

(27) Indicate by note the minimum rate of water application per sprinkler head, the maximum spacing for each head, and the domestic demand.

(28) Information about antifreeze solution used. Indicate the type of antifreeze used, the amount of antifreeze in the system, and information about antifreeze compatibility with the pipe.

(29) General notes or tables as required by the AHJ.

(30) Edition year of NFPA 13D to which the sprinkler system is designed.

(31) Utility plans and/or plumbing plans necessary to show connection from water supply to fire sprinkler system.

6.2.3.1 System control valve location – SN

6.2.3.1 The control valve shall be required to serve the domestic water supply.

6.3.1.1 Passive purge systems – SN

6.3.1.1 Passive purge sprinkler systems shall meet the requirements of Section 7.8.

6.3.1.2 Network systems – SN

6.3.1.2 Network sprinkler systems shall meet the requirements of Section 7.9.

6.5.3 Water treatment and filtration loop location – SN

6.5.3 The installation of a water treatment and filtration loop shall be in accordance with Section 7.8.4 or 7.9.2.

7.1.1 System control valve location – SN

7.1.1 A single control valve arranged to shut off both the domestic system and the sprinkler system shall be installed.

7.1.2 System control valve limitations – SN

7.1.2 The sprinkler system piping shall not have separate control valves installed.

7.5.6.2 Sprinkler temperature rating – SN

7.5.6.2 Sprinklers stored or installed where maximum ambient ceiling temperatures exceed 100° F (38° C) shall be intermediate temperature-rated sprinklers unless modified by 7.5.6.3.

7.8 Passive purge sprinkler system requirements – SN

7.8 Passive Purge Sprinkler Systems. Passive purge sprinkler systems shall supply a minimum of one toilet fixture. Passive purge sprinkler systems shall meet the requirements of Sections 7.8.1 through 7.8.5.

7.8.1 An accessible check valve shall be installed on the fire sprinkler riser to maintain system pressure.

7.8.2 A pressure gauge shall be installed on the supply side of the check valve.

7.8.3 A supply line from the sprinkler system loop shall feed into the toilet in the master bathroom.

7.8.4 The installation of a backflow preventer, water treatment and filtration device, or a pressure reducing valve between the water meter and the fire sprinkler system is prohibited.

7.8.5 The fire sprinkler system piping shall be designed as a looped system, in a manner that water circulates throughout the system. Dead-end supply lines off of the loop to individual sprinkler heads shall be permitted where each individual dead end does not exceed 50 feet in total length.

7.9 Network sprinkler system requirements – SN

7.9 Network Sprinkler Systems. Network sprinkler systems shall provide supply for all interior domestic fixtures and fire sprinkler needs. Network sprinkler systems shall meet the requirements of sections 7.9.1 through 7.9.4.

7.9.1 A pressure gauge shall be installed on the supply side of the dwelling unit control valve in the garage or other accessible location. Where a pressure-reducing valve is installed after the control valve, the pressure gauge shall be installed on the outlet side of the pressure-reducing valve.

7.9.2 Where water treatment and filtration loops are installed, the network sprinkler system design shall incorporate one of the following conditions:

(1) The flow restriction and pressure loss through the water treatment equipment shall be taken into account in the hydraulic calculations.

(2) An automatic bypass shall be installed around the water treatment equipment that directs all water directly to the system.

7.9.3 The fire sprinkler system piping shall be designed as a networked system, with interconnection of all domestic fixtures and fire sprinkler heads, in a manner that water circulates throughout the system when any domestic fixture is flowing. Dead-end supply lines shall only be permitted to supply domestic fixtures.

7.9.4 Where required by the authority having jurisdiction, network sprinkler systems shall be performance tested to prove one-head and two-head flow scenarios, in addition to other inspections and approvals required by this code. Testing shall replicate the effect of devices that restrict flow and pressure, such as water filtration systems, water softeners and pressure reducing valves.

8.1.3.1.2 Approval of special conditions – SN

8.1.3.1.2* Where construction features or other special conditions exist that are outside the scope of sprinkler listings, listed sprinklers shall be permitted to be installed beyond their listing limitations, provided the installation conforms to a modification or alternative materials and methods report that has been approved by the authority having jurisdiction.

8.3.4 Sprinkler protection in garages – SN

8.3.4* Sprinklers shall not be required in detached garages, open attached porches and balconies, carports, and similar structures.

Exception:

(1) Detached garages that have habitable space (as defined in the IRC) shall require sprinklers.

8.3.11 Open stairwells – SN

8.3.11 Open Stairwells.

8.3.11.1 Sprinkler protection shall be provided under open stairwells greater than 4 ft wide.

8.3.11.2 Sprinklers shall be installed under each landing of open stairwells.

8.3.11.3 Stair risers shall not be considered an obstruction to sprinkler discharge. Sprinklers shall not be required underneath stair risers provided the floor area protection of stair risers are within the landing(s) sprinkler(s) design coverage area.

8.4 Protection matrix – SN

8.4 Protection Matrix for Group R Division 3 Occupancies and Buildings Built Under the IRC.

8.4.1 General. When a sprinkler system is being upgraded or installed to mitigate the minimum Fire Code requirements for fire flow, number of fire hydrants, or fire department access, the design requirements in Table 8.4.1 shall be applied.

Table 8.4.1 Protection Matrix for Group R Division 3 Occupancies and Buildings Built Under the IRC[4]

Fire Lane Distance per IFC 503.1.1	Building Area Size Range[5]	Mitigation Residential System Type[1,3]	Minimum Water Meter Size[6]	Sprinklers Required In Areas Subject To Freezing
≤350 FT	≤10,000 ft^2	Enhanced NFPA 13D[1,2]	3/4"[7]	No
≤350 FT	>10,000 ft^2	Enhanced NFPA 13D 4 head calculation[1,2,8]	1"	No
>350 FT	Any Size	Enhanced NFPA 13D 4 head calculation[1,2,8]	1"	No

Notes:

(1) This mitigation constitutes a building “protected with an approved automatic sprinkler system” per the IFC.

(2) Domestic demand of 5gpm is required to be added to the sprinkler demand in the hydraulic calculations.

(3) Free-standing detached buildings with habitable space (as defined in the IRC) shall be protected by a minimum Enhanced NFPA 13D system.

(4) Excluding Group Care Homes with two or less persons being cared for per NRS 449.1865.

(5) Building area is defined as the areas under roof except for porches, patios, balconies, carports, and porte cocheres.

(6) Water meters used for residential sprinkler systems shall be residential fire service meters or other meters approved by the water purveyor.

(7) Minimum 1” water meters shall be installed in the City of Henderson.

(8) Enhanced 13D 4-head calculation design requires the hydraulic design area to include all sprinklers within a compartment, up to a maximum of four sprinklers.

8.4.2 Where required. When Table 8.4.1 requires an Enhanced 13D design, sprinklers shall be installed throughout the structure except where omissions are permitted by the following:

(1) Unheated attic spaces.

(2) Floor/ceiling spaces.

(3) Concealed combustible spaces with no access for storage or living purposes.

(4) Exterior overhangs, porches, and carports.

(5) Showers, saunas, steam rooms or other areas that would necessitate the installation of corrosion proof heads.

(6) Unconditioned spaces such as storage rooms or exterior accessible spaces that are subject to freezing.

(7) Unconditioned spaces and areas subject to freezing.

9.1.2.1 Freeze protection – CC

9.1.2.1 Where any portion of a system is subject to freezing and the temperature cannot be maintained at or above 40°F (4°C), the pipe shall be protected against freezing by use of one of the following methods:

(1) Dry pipe system and preaction systems in accordance with Section 9.3

(2) Antifreeze system in accordance with Section 9.2

(3) Listed standard dry pendent or dry sidewall sprinklers extended from pipe in heated areas or piping protected with minimum R-2 insulation into unheated areas not intended for living purposes

(4) Listed heat tracing provided that it is installed and insulated in accordance with manufacturer's instructions, specifically heat tracing used on branch lines is listed for branch lines of fire sprinkler systems

(5) Listed residential dry pendent or dry sidewall sprinklers extended from pipe in heated areas or piping protected with minimum R-2 insulation into unheated areas

(6) Piping protected with minimum R-2 insulation

(7) Where sprinkler protection is provided in attached garages, listed wet, concealed pendent sprinklers extended from pipe in heated areas or piping protected with minimum R-2 insulation into unheated areas

10.1.2 Water supply quantification – SN

10.1.2 Water Supply. A copy of the water supply report shall be submitted with the permit package to support the hydraulic calculations. When water purveyors have the ability to provide a water model proving the available water supply, water model reports shall be provided in lieu of fire hydrant flow tests. Where the system is located outside the municipal system a traditional flow test must be permitted, performed, and recorded with the AHJ. When approved by the AHJ, other means to quantify the water supply may be accepted.

10.2.4.1 Sprinklers in high ceilings – CC

10.2.4.1 Where the ceiling height exceeds the 24 feet limitation in Section 10.2.1, the count of fire sprinklers included in the hydraulic calculations as specified in Section 10.2.1 and mitigation matrix Section 8.4, shall be increased by 50%. Heads of pendant and upright orientation are required to have a minimum K-factor of 4.9, and heads of sidewall orientation are required to have a minimum K-factor of 4.2.

10.4.3.1 10psi safety margin – CC

10.4.3.1 System piping shall be designed to ensure the required system pressure is a minimum of ten (10) psi below the available supply pressure.

> **Exception:** The pressure safety factor of Section 10.4.3.1 shall not be required where a water flow switch is incorporated into the supply riser assembly and connected to the Smoke Alarm circuit to activate all alarms upon waterflow. Waterflow switch selection, by means of both minimum rated flow and minimum retard time to alarm, shall ensure that false activation of smoke alarms due to toilet connection is avoided.

10.4.6.1 Water supply quantification – SN

10.4.6.1 A copy of the water supply report shall be submitted with the permit package to support the hydraulic calculations. When water purveyors have the ability to provide a water model proving the available water supply, water model reports shall be provided in lieu of fire hydrant flow tests. Where the system is located outside the municipal system a traditional flow test must be permitted, performed, and recorded with the AHJ. When approved by the AHJ, other means to quantify the water supply may be accepted.

10.4.7.1 Water supply quantification – SN

10.4.7.1 A copy of the water supply report shall be submitted with the permit package to support the hydraulic calculations. When water purveyors have the ability to provide a water model proving the available water supply, water model reports shall be provided in lieu of fire hydrant flow tests. Where the system is located outside the municipal system a traditional flow test must be permitted, performed, and recorded with the AHJ. When approved by the AHJ, other means to quantify the water supply may be accepted.

12.1 Homeowner documentation – SN

12.1* General. The installer shall provide to the owner/occupant instructions on inspecting, testing, and maintaining the system. This shall include a copy of the approved fire sprinkler shop drawings.

2022 NFPA 13R

1.1 Scope – SN

1.1* Scope. This standard shall cover the design and installation of automatic sprinkler systems for protection against fire hazards in residential occupancies complying with all of the following:

(1) Two stories or less above grade plane.

(2) For other than Group R-2 occupancies, the floor level of the highest story is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access.
For Group R-2 occupancies, the roof assembly is less than 45 feet (13 716 mm) above the lowest level of fire department vehicle access. The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance.

(3) The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the International Building Code shall be measured from grade plane.

Residential occupancies not in compliance with this section shall be protected throughout in accordance with NFPA 13.

5.1.3 Rated pressure – CC

5.1.3 Rated Pressure. System components shall be rated for the maximum system working pressure to which they are exposed but shall not be rated at less than 175 psi (12.1 bar) for components installed above ground and 150 psi (10 bar) for components installed underground between the water supply and the system riser. When the underground piping can be supplied or pressurized by a fire pump or a fire department connection (FDC), the underground piping shall be designed to withstand a working pressure of not less than 200 psi (Class 305), or 50 psi greater than the FDC design pressure, whichever is greater.

6.4.4 Approval of special conditions – SN

6.4.4* Where construction features or other special conditions exist that are outside the scope of sprinkler listings, listed sprinklers shall be permitted to be installed beyond their listing limitations, provided the installation conforms to a modification or alternative materials and methods report that has been approved by the authority having jurisdiction.

6.6.4 Sprinkler protection in utility closets – SN

6.6.4* Sprinklers shall be installed in any closet used for heating or air-conditioning equipment, washers, dryers, or water heaters or containing fuel-fired equipment.

6.6.7 Sprinkler protection in small closets – SN

6.6.7 Sprinklers shall not be required in closets (regardless of size) on exterior balconies if all of the following conditions are met:

(1) The closet does not have doors leading directly into the dwelling unit.

(2) The closet does not have unprotected penetrations directly into the dwelling unit.

(3) The balcony is not used as a means of egress.

(4) The closet does not contain any fuel-fired equipment.

6.7.2.3.2 Corrosion resistance ratio – CC

6.7.2.3.2 Piping shall have a minimum corrosion resistance ratio (CRR) of 1. Where water supplies area known to have unusual corrosive properties and threaded or cut grooved steel pipe is to be used, wall thickness shall be in accordance with Schedule 30 (in sizes 8 in. (200mm) or larger) or Schedule 40 (in sizes less than 8 in.(200mm)).

6.7.2.3.2.1 Where a scope of work includes the removal, replacement, or relocation of existing piping with a corrosion resistance ratio of less than 1, such piping shall be removed and replaced with piping with a minimum CRR of 1.

6.8.2 Supervision of valves – SN

6.8.2 The sprinkler system piping shall not have a separate control valve installed unless supervised by a central station, proprietary, or remote station alarm service.

6.15 Drop out ceilings – SN

6.15 Drop-Out Ceilings. This section is deleted from NFPA 13R.

8.1.7 Working plans – SN

8.1.7 Working plans shall be drawn to an indicated scale, on sheets of uniform size, with a plan of each floor, and shall show those items from the following list that pertain to the design of the system:

(1) Edition year of this standard to which the sprinkler system is designed

(2) Project name

(3) Location, including street address

(4) Name and address of the contractor

(5) Point of compass

(6) A graphic representation of the scale used on all plans

(7) Full height cross-section or schematic diagram, including structural member information, if required for clarity, and including ceiling construction and method of protection for nonmetallic piping

(8) Ceiling/roof heights and slopes not shown in the full height cross section

(9) Location of partitions, fire barriers, fire walls, draft curtains, and similar features as they relate to the sprinkler system including lintels and doorways, lintel openings require a cross-section view to indicate the area of the opening.

(10) Any small enclosures in which no sprinklers are to be installed

(11) Location and size of concealed spaces, attics, closets, and bathrooms

(12) Location of fuel-fired equipment and heating and air conditioning equipment

(13) Location of closets on exterior balconies, and any doors or penetration between the closet and the dwelling unit

(14) Area per floor

(15) Size of the city main in street and the city main test results, including elevation of the test hydrant

(16) Underground pipe size, length, location, weight, material, and point of connection to the city main; type of valves, meters, and valve pits; and depth at which the top of the pipe is laid below grade

(17) Size and location of hydrants, showing size and number of outlets, including any static and residual hydrants that were used in flow tests

(18) Size, location, and piping arrangement of fire department connections

(19) Information about backflow preventers (e.g., manufacture, size, type)

(20) Make, manufacturer, type, temperature rating, sprinkler identification number, and nominal K-factor of the sprinkler

(21) Type and location of high-temperature sprinklers

(22) Number of sprinklers on each riser, per floor

(23) Type of pipe and fittings

(24) Pipe type and schedule of wall thickness

(25) Nominal pipe size and lengths (lengths as they relate to hydraulic reference points)

(26) Location and size of riser nipples

(27) Type of fittings and joints and the location of all welds and bends

(28) All control valves, check valves, drainpipes, and test connections

(29) Information about antifreeze solution used (e.g., type and amount)

(30) Type and location of alarm bells

(31) Types and locations of hangers, sleeves, and braces, and methods of securing sprinklers, where applicable

(32) Where the equipment is to be installed as an addition to an existing system, enough of the existing system indicated on the plans to make all conditions clear

(33) Hydraulic reference points shown on the plan that correspond with comparable reference points on the hydraulic calculation sheets.

(34) The minimum rate of water application and the design area of water application

(35) The total quantity of water and the pressure required noted at a common reference point for each system

(36) Relative elevations of sprinklers, junction points, and supply or reference points

(37) For hydraulically designed systems, the information on the hydraulic data nameplate, including safety margin

(38) Contractor’s license number of sprinkler contractor

(39) Occupancy, label, and name for each area or room

(40) Make, type, model, and size of alarm or dry pipe valve, approximate capacity in gallons of each dry pipe system

(41) Nevada State Fire Marshal registration number

(42) Signature and NICET number, or engineer's seal, of the designer

(43) General notes as required by the AHJ

8.2.3 10psi safety margin – SN

8.2.3 Hydraulically calculated fire sprinkler systems shall be designed to ensure the required system pressure is a minimum of ten (10) psi below the available supply pressure.

7.9.7 FDC check valves – SN

7.9.7 Fire department connections shall be provided with internal check valve(s) such that water being supplied into any inlet will not flow back out of any other inlet. For the purpose of this section, internal clapper valve devices provided by the manufacturer in the listed fire department connections shall be considered internal check valves. (*see Section 10.7 for design requirements*)

9.5.2.2 Horizontal exit hose valve location – CC

9.5.2.2* Horizontal Exits. Hose connections shall be visible from and provided within 5ft (1.5 m) of each side of horizontal exits.

9.5.2.2.1.1 Horizontal exit omission, sprinklered – SN

9.5.2.2.1.1 The travel distance in 9.5.2.2.1 shall be limited to 100 ft of hose and 30 ft of stream from each hose valve connection for sprinklered buildings.

9.5.2.2.1.2 Horizontal exit omission, nonsprinklered – SN

9.5.2.2.1.2 The travel distance in 9.5.2.2.1 shall be limited to 100 ft of hose and 30 ft of stream from each hose valve connection for nonsprinklered buildings.

9.5.2.4.1 Hose valve coverage, sprinklered – SN

9.5.2.4.1* Additional hose connections shall be provided in fully sprinklered buildings in accordance with NFPA 13 or NFPA 13R so that all floor areas of the floor or story are protected by hose valve coverage, with travel distance limited to 100 ft of hose and 30 ft of stream from each hose valve connection.

9.5.2.4.2 Hose valve coverage, nonsprinklered – SN

9.5.2.4.2* Additional hose connections shall be provided in buildings not meeting the requirements of 9.5.2.4.1 so that all floor areas of the floor or story are protected by hose valve coverage, with travel distance limited to 100 feet of hose and 30 feet of stream from each hose valve connection.

9.5.2.4.3 Hose valve coverage, open parking garage – SN

9.5.2.4.3 In open parking garages, the distances shall be in accordance with 9.5.2.4.1 and 9.5.2.4.2.

9.5.2.8.1 Hose valve coverage, helistop & helipad – SN

9.5.2.8.1 All portions of the helistop and heliport shall be within a maximum travel distance of 100 feet of hose and 30 feet of stream from each Class I hose connection.

9.5.3 Hose valve coverage, class 2 systems – SN

9.5.3 Class II Systems. Class II systems shall be provided with hose stations so that all portions of each floor level of the building are within a maximum travel distance of 100 feet of hose and 30 feet of stream to a hose connection provided with 1½ in. (40 mm) hose.

9.5.5.1 Hose valve clearances – SN

9.5.5.1 Hose connections shall be located so that there is at least 3 in. (75 mm) clearance between any adjacent object and the handle of the valve when the valve is in any position ranging from fully open to fully closed, and 6 in. (150 mm) clearance around the circumference of the outlet/cap from any adjacent object.

9.6.2.1 Individual hose valves connected to feed mains – SN

9.6.2.1 Individual hose valves fed from the feed main shall each be provided with an isolation valve, such that maintenance of the individual hose valve can be accomplished without interrupting the supply to standpipes fed from the feed main.

9.6.8.1 Supervision of valves – SN

9.6.8.1 Valves controlling water supplies shall be supervised in an approved manner in the open position by a central station, proprietary, or remote station signaling service.

9.9.5.3.1 FDC signs – SN

9.9.5.3.1 Signs shall have a red background and be professionally engraved with white lettering a minimum of 1 in. (25.4 mm) in height, with a minimum stroke of ¼ in. Signs shall consist of durable, weatherproof materials, subject to approval by the authority having jurisdiction.

9.10.1.1.2 Drain riser requirements – SN

9.10.1.1.2 The drain riser connections shall be located on every floor with a hose valve pressure-regulating device. A drain connection shall be provided adjacent to every hose valve pressure-regulating device, even if the pressure-regulating device is not on a vertical standpipe riser.

10.2.4.2 Hose valve maximum pressure – SN

10.2.4.2* Where the static pressure at a 2½ in. (65 mm) hose connection exceeds 200 psi (13.8 bar), a listed pressure-regulating device shall be provided to limit static and residual pressures at the hose connection to no more than 200 psi (13.8 bar)

10.2.4.4 PRV hose valve requirements – SN

10.2.4.4 Where hose valve pressure-regulating devices are installed on 2½ in. (65 mm) outlets, they shall be field adjustable, capable of being adjusted through the full adjustment range by a 3/8 in. (12 mm) rod with a maximum required torque of 30 foot-pounds (41 nm) while flowing water. Field adjustment shall not require any hose valve disassembly.

10.2.5 Master PRV station requirements – SN/CC

10.2.5* Where more than two hose connections are used downstream of a pressure-regulating device, the following conditions shall apply:

(1) In systems with multiple zones, pressure-regulating device(s) shall be permitted to be used in lieu of providing separate pumps to control pressure in the lower zone(s) as long as the devices comply with all requirements in 10.2.5. If a sprinkler system will be connected to pressure-regulating device, a low flow pressure-regulating device must be provided to accommodate the flowing of a single sprinkler head. For each pressure-regulating device provided, a secondary pressure-regulating device matching the primary device shall be provided in parallel configuration.

(2) A method to isolate each of the pressure-regulating device(s) shall be provided for maintenance and repair by providing control valves on the supply and discharge side of each pressure-regulating device, in a manner where only the device being maintained and repaired is out of service.

(3) To provide redundancy, pressure-regulating devices shall be arranged in parallel so that the failure of any single device does not allow pressure in excess of 200 psi (13.8 bar) to any of the multiple hose connections downstream.

(4) An equally sized bypass around the pressure-regulating device(s), with a normally closed valve, shall be installed.

(5) Pressure-regulating device(s) and the bypass valve shall be installed not more than 7 ft 6 in (2.3 m) above the floor.

(6) The pressure-regulating device shall be provided with inlet and outlet pressure gauges.

(7) The fire department connection(s) shall be connected between the system fire pump(s) and the pressure-regulating device(s) and shall be sized and designed to allow the fire department connection to match the pressure and flow from the fire pump.

(8) The pressure-regulating device shall be provided with a pressure relief valve sized for the full anticipated system flow and capable of maintaining downstream system pressures below the maximum pressure ratings for all system components.

(9) Remote monitoring and supervision for detecting high pressure failure of the pressure-regulating device shall be provided in accordance with NFPA 72.

(10) A drain sufficient to allow flow of the full anticipated system flow shall be provided adjacent to the pressure-regulating devices. Use of this drain line for discharge from the pressure relief valve shall be permitted.

(11) A permanent sign shall be provided at the pressure-regulating device to indicate what the valve needs to be set at for proper system operation.

10.2.6.1 Hose connection minimum design pressure – SN

10.2.6.1 Minimum Design Pressure for Hydraulically Designed Systems. Hydraulically designed standpipe systems shall be designed to provide the waterflow rate required by Section 10.6 at a minimum residual pressure of 125 psi (8.6 bar) at the outlet of the hydraulically most remote 2½ in. (65 mm) hose connection and 65 psi (4.5 bar) at the outlet of the hydraulically most remote 1½ in. (40 mm) hose connection.

10.2.6.1.2 Hose connection minimum design pressure, manual systems – SN

10.2.6.1.2* Manual standpipe systems shall be designed to provide 125 psi (8.6 bar) at the outlet of the hydraulically most remote 2½ in. (65 mm) hose connection valve with the calculations terminating at the fire department connection (FDC) or FDCs where multiple connections are provided.

11.1.2 Working plans – SN

11.1.2 Working plans shall be drawn to an indicated scale, on sheets of uniform size, and shall show sufficient information to demonstrate code-compliant design, including, at minimum, those items from the following list that pertain to the design of the system:

(1) Name of owner(s) or owner's (owners') representative

(2) Location, including street address

(3) Point of compass

(4) Name, address, phone number, and contractor's license number of installing contractor

(5) For automatic and semiautomatic standpipe systems, the following:

  (a) Layout of underground mains between the in-building riser and the location(s) of sources of supply including pipe sizes, lengths, material, and weights (pressure class or dimension ratio).

  (b) Locations and types of meters, backflow prevention devices, valves, and valve pits.

(6) For automatic and semiautomatic standpipe systems, other sources of supply, with pressure and elevation

(7) For automatic dry and semiautomatic dry standpipe systems, approximate capacity of each dry pipe system

(8) For automatic and semiautomatic standpipe systems, 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 the test was conducted

  (g) Time the test was conducted

  (h) Name of person who conducted the test or supplied the information

  (i) Other sources of water supply, with pressure or elevation

(9) Pipe type and schedule of wall thickness

(10) Nominal pipe size and cutting lengths of pipe (or center-to-center dimensions)

(11) Type of fittings and joints and locations of all welds and bends

(12) Type and location of hangers, sleeves, braces, methods of securing piping, and seismic calculations

(13) All control valves, check valves, drain pipes, and test connections

(14) Make, type, model, and size of alarm, dry pipe, or deluge valve

(15) Type and location of alarms

(16) Size and location of standpipes, hose connections, hand hose, nozzles, cabinets, and related equipment with details from the manufacturer including model numbers and sizes

(17) Information on the hydraulic data nameplate

(18) Hydraulic reference points shown on plan including the top view, section view, and isometric view, that correspond with comparable reference points on the hydraulic calculation sheets

(19) The setting for pressure-regulating devices including direct-acting and pilot-operated valves, and provide a detail for each unique installation configuration

(20) The size and location of hydrant(s) in relation to FDCs

(21) Size, location, and piping arrangement of FDCs

(22) Scale and graphical representation of the scale

(23) Hose valve manufacturer and model

(24) Pressure-reducing valve(s) manufacturer and model

(25) Required pressure at hose valve outlet

(26) Location of hose valves used in the hydraulic calculations

(27) Standpipe system demand (flow and pressure) at the following locations:

- (a) FDC inlet
- (b) Fire pump discharge flange
- (c) Water supply tank discharge
- (d) Water supply source if different from (a) through (c)

(28)* Legend defining all symbols used on the working plans

(29) Provide a detailed narrative describing the scope of work and the following items:

- (a) Standpipe system type and class
- (b) Minimum and maximum pressure requirements
- (c) The type of freeze protection, if applicable
- (d) The total quantity of hose valves being installed
- (e) The pressure required for the hydrostatic test, being 200psi or the pressure that is 50psi above pump churn pressure, whichever is higher.

(30) Nevada State Fire Marshal registration number

(31) Signature and NICET number, or engineer’s seal, of the designer

(32) General notes as required by the AHJ

(33) Provide an isometric view showing the entire system in one view including hydraulic reference points

(34) Full height cross section with ceiling construction

(35) Locations of fire walls, fire partitions, horizontal exits, and exit passageways

(36) Label and name of each area or room

(37) Where remote FDC’s are implemented, underground piping and valve information as applicable from item #5

(38) Provide information regarding the fire pump, as applicable

(39) Provide a detail of each required sign

(40) Plan view shall show, at minimum, supply and drain pipe layout, pipe dimensions, attachments, braces, hangers, standpipe hose outlets, hydraulic nodes, and the coverage area from each hose valve to the remote areas of the floor plan.

(a) Coverage areas of hose valves shown as hose lay on the floor plan to remote areas where hose lay is limited to 100’ and spray is limited to 30’. Hose lay shall be shown as the normal path of travel along the floor observing walls, doors, permanent obstructions such as millwork, cubicles, machinery, etc. Hose spray shall not turn nor bend

(41) Provide a detail of Class I, Class II, or Class III hose valves located in cabinets. Dimensions shall be provided to show that the cabinet size and the placement of items within the cabinet meet the requirements of Sections 7.6.1 and 9.5.5.1

(42) Where equipment is to be installed as an addition to an existing system, enough of the existing system indicated on the plans to make all conditions clear

(43) Provide details for penetrations of standpipe piping through walls, floors, and other structural members. Show detail to note clearances around the piping and/or locations of flexible connections

(44) Provide details for penetrations in rated walls and floors, providing information regarding the method of maintaining fire rating of the wall or floor

(45) Where direct-acting pressure-regulating hose valves are provided anywhere in the building, provide a chart on the plans. The chart shall have eight columns, as follows:

(a) Floor Level – Provide numerical designation for all floor levels in the building

(b) Static Pressure, Inlet – Indicate the static pressure at the inlet of each hose valve on all floor levels. Provide a supporting hydraulic calculation at zero flow with churn pressure, providing a node at the hose valve on each floor level to indicate the static pressure at each hose valve

(c) Residual Pressure, Full Flow, Inlet – Indicate the residual pressure at the inlet of each hose valve on all floor levels. Provide a supporting hydraulic calculation at full standpipe design flow per NFPA 14 (750 or 1000gpm), providing a node at each hose valve to indicate the residual pressure at each hose valve inlet

(d) Residual Pressure, 250-gpm flow, Inlet – Indicate the residual pressure at the inlet of hose valves on each floor while flowing 250gpm. Provide a supporting hydraulic calculation at 250gpm flow at the most remote standpipe outlet, providing a node on each floor level of the most remote standpipe to indicate the residual pressure at each hose valve

(e) Valve Make and Model – Indicate the manufacturer of the valve on all floors, and the model number for the specific valve. Provide supporting manufacturer specifications

(f) Valve Setting – Indicate the hose valve setting or bonnet number proposed for each valve. The setting or bonnet number must be associated with the manufacturer specifications for the valve

(g) Residual Pressure, Full Flow, Outlet – Indicate the residual outlet pressure at the outlet of the hose valve under the full-flow condition. For PRV installations, the residual pressure is taken from the pressure relation charts provided by the manufacturer. For non-PRV installations, the residual pressure is taken by analysis of the equivalent lengths of the fittings and the hose valve

(h) Residual Pressure, 250-gpm flow, Outlet – Indicate the residual outlet pressure at the outlet of the hose valve when flowing 250gpm. This is necessary to establish the residual pressure expected during field inspection. For PRV installations, the residual pressure is taken from the pressure relation charts provided by the manufacturer

(46) Edition year of NFPA 14 to which the standpipe system is designed

(47) Other items required by AHJ

2022 NFPA 20

4.2.1.1 All pumps limited to 110% of rated capacity – CC

4.2.1.1 A fire pump for fire protection shall be selected to operate at less than or equal to 110 percent of the rated capacity.

4.10.1 Centrifugal pumps limited to 110% of rated capacity – CC

4.10.1 A centrifugal fire pump for fire protection shall be selected so that the greatest single demand for any fire protection system connected to the pump is less than or equal to 110 percent of the rated capacity (flow) of the pump.

4.12.1.1 Discharge flange gauge – SN

4.12.1.1 A liquid-filled pressure gauge having a dial not less than 3.5 in. (89 mm) in diameter shall be connected near the discharge casting with a 0.25 in. (6 mm) gauge valve.

4.12.2.1 Suction flange gauge – SN

4.12.2.1 Unless the requirements of 4.12.2.4 are met, a liquid-filled gauge having a dial not less than 3.5 in. (89 mm) in diameter shall be connected to the suction pipe near the pump with a 0.25 in. (6 mm) gauge valve.

4.16.4.1 Bypass piping required – SN

4.16.4.1 All pumps supplied by municipal water supply shall be installed with a bypass. (*See Figure A.4.16.4.*)

4.22.1.1.1 Flow meter required – SN

4.22.1.1.1 All fire pumps shall be installed with a metering device.

9.3.1 Alternate source of power required – CC

9.3.1 Unless there is an installed power arrangement as described in 9.3.3, at least one alternative source of power shall be provided for high-rise buildings and buildings containing residential or institutional occupancies.

9.3.4 Limitations on alternate power source – SN

9.3.4 Where provided, the alternate source of power shall be supplied from one of the following sources:

(1) A generator installed in accordance with Section 9.6

(2) One of the sources identified in 9.2.2(1), 9.2.2(2), 9.2.2(3), or 9.2.2(5) where the power is provided independent of the normal source of power. Any connections to the public utility shall be considered a single source of power and subsequently cannot be utilized as both normal power and the alternate (backup) power.

10.2.1 Electric pump controller location – SN

10.2.1* Controllers shall be located as close as is practical to the motors they control and shall be within sight of the motors. Controllers shall be readily accessible and have clear access to the entrance to the room.

10.4.7.1.1 Electric pump remote annunciator required in FCC – SN

10.4.7.1.1 Where the fire pump serves a building equipped with a Fire Command Center, the signal(s) required remote from the controller per 10.4.7.2, shall be indicated both on a dedicated panel provided by the fire pump manufacturer and on the fire alarm control panel.

11.3.2.1 Diesel pump room ventilation requirements – CC

11.3.2.1 Ventilation shall be provided for the following functions:

(1) To control the maximum temperature to 120°F (49°C), or to the temperature used for engine derating per Section 11.2.2.5, whichever is lower, at the combustion air cleaner inlet with engine running at rated load

(a) Ventilation method: Providing exhaust fan from high point in room, preferably at the ceiling, with ventilation CFM calculated to CFM = BTUH/(1.08 * delta T), where delta T is the difference between the room conditioned temperature and the temperature used for engine derating, and BTUH is total BTU per hour rejected to ambient by the engine, in accordance with engine manufacturer specifications. Where the engine exhaust pipe is not insulated, the heat from the exhaust pipe and muffler shall be considered another heat source that increases the total BTUH. Where exhaust is required for Item (3) below, the total exhaust shall be the greater of that required for ventilation or item (3). Air supply is to be from a low point in room, below the elevation of the engine air intake, opposite from the exhaust point such that airflow occurs across the engine. The supply CFM provided shall be sufficient for temperature control, and sufficient to also accommodate any supply air required for Items (2) through (3) below. Note that the conditioning required for room envelope heat gains and any air infiltration to be separately accomplished by the air conditioning system provided in accordance with IFC Section 901.4.7.3

(b) Air Conditioning Method: Provide sufficient air conditioning cooling capacity for room envelope and air infiltration heat gains from the hottest design day, and BTUH of engine, in the aggregate, in addition to outside air supply and exhaust to exterior to address items (2) and (3) below. Where the engine exhaust pipe is not insulated, the heat from that pipe and muffler shall be considered another heat source that increases the total BTUH. Air conditioning supply to be directed to the engine, with documentation of throw from air conditioning supply point provided to show all conditioned air supply flow passes through the engine volume. Air return to be from high point in room to condition hottest air. Supply air required for Item (2) and (3) shall be provided with vent at low point in room, preferably below the elevation of the engine air intake, directly from exterior, and included in infiltration of air heat gain calculation. Exhaust air required for Item (3) shall be provided with exhaust fan at high location in room, preferably at the ceiling, to the building exterior. Air CFM for supply and exhaust air for Item (2) and (3) is to be in addition to and separate from CFM rating of air conditioning systems

(2) To supply air for engine combustion

(3) To remove any hazardous vapors at a minimum rate of 150 cfm exhaust, or 1 cfm exhaust per sf of room area, or as required by manufacturer installation instructions, whichever is greatest

(4) To supply and exhaust air as necessary for radiator cooling of the engine when required

11.3.2.3.3 Diesel ventilation requirements, supply air – SN

11.3.2.3.3 Motor-operated dampers shall be installed in the air supply path. Such dampers shall be spring operated to the open position and motor closed. Motor-operated dampers shall be signaled to open when or before the engine begins cranking to start.

> **Exception:** Open-air vents shall be permitted when complying with 11.3.2.3.2 and as approved by the building department or as approved by the AHJ.

11.3.2.4.4 Diesel ventilation requirements, heat exchanger engines – SN

11.3.2.4.4 Heat Exchanger-Cooled Engines.

11.3.2.4.4.1 For heat exchanger-cooled engines, motor-operated dampers shall be installed in the air discharge path. Such dampers shall be spring operated to the open position and motor closed. Motor-operated dampers shall be signaled to open when or before the engine begins cranking to start.

> **Exception:** Open-air vents shall be permitted when complying with 11.3.2.4.4.2 and as approved by the building department or as approved by the AHJ.

11.3.2.4.4.2 The air discharge path for heat-exchanger-cooled engines shall not restrict the flow of air more than 0.3 in. water column (7.6 mm water column).

11.5.2.4 Diesel exhaust insulation required – CC

11.5.2.4 The exhaust pipe shall be covered with high-temperature insulation.

12.2.1 Diesel pump controller location – SN

12.2.1* Controllers shall be located as close as is practical to the engines they control and shall be within sight of the engines. Controllers shall be readily accessible and have clear access to the entrance to the room.

12.4.2.1.1 Diesel pump remote annunciator required in FCC – SN

12.4.2.1.1 Where the fire pump serves a building equipped with a Fire Command Center, the signal(s) required remote from the controller per 12.4.2.3, shall be indicated both on a dedicated panel provided by the fire pump manufacturer and on the fire alarm control panel.

2023 NFPA 22

4.2.1.4.1 Tank fill time – SN

4.2.1.4.1 When approved by the AHJ, alternative water sources provided in accordance with 4.2.1.2 or manual refilling in accordance with 14.4.1.1 shall be capable of filling the minimum required fire protection volume of the tank within a time acceptable to the AHJ.

14.5.2.2 Break tank refill rate – SN

14.5.2.2 If the break tank is sized to provide a minimum duration of 30 minutes of the maximum system demand, the refill mechanism shall meet the requirements in 14.5.2.2.1 through 14.5.2.2.3.

14.5.2.2.1 The refill mechanism shall be designed for and capable of refilling the tank at a minimum rate of 150 percent of the fire pump(s) capacity.

14.5.2.2.2 A manual tank fill bypass shall be designed for and capable of refilling the tank at a minimum rate of 150 percent of the fire pump(s) capacity.

14.5.2.2.3 If available supplies do not permit refilling the tank at a minimum rate of 150 percent of the rated pump capacity, the refill mechanism and manual fill bypass shall be capable of refilling the tank at a rate that meets or exceeds 110 percent of the maximum fire protection system design flow.

14.6.1.1 Tank overflow discharge – SN

14.6.1.1 Discharge. The overflow pipe shall discharge water to a drain with flow capacity equal to or greater than the fill line supply flow, or to an approved exterior location subject to approval by the authority having jurisdiction.

14.9.1.1 Tank sensors – SN

14.9.1.1 Where the water storage tank acts as a break tank between the city supply and the fire pump(s), water level sensors shall be provided. A minimum of three sensor levels shall be provided. Two sensor levels shall activate the turn-on/turn-off of the fill valve. The third sensor level shall indicate a low-level alarm. The sensor that opens the fill control valve shall be set 5 inches (127mm) below normal (full) level, or at 90% of the normal (full) volume, whichever leaves the greater volume in the tank. The sensor that closes the fill control valve shall be set at normal (full) level. The sensor that signals a low alarm shall be set 12 inches (300 mm) below normal (full) level, or at 70% of the normal full volume, whichever leaves the greater volume in the tank. The low-level alarm shall be transmitted to a constantly attended location to initiate response to operate the fill control bypass valve.

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6.6.1 Sectional control valves – SN

6.6.1* Sectional valves shall be provided on looped systems at locations within piping sections such that the number of fire protection connections between sectional valves does not exceed two.

6.6.2 Sectional control valves – SN

6.6.2 A sectional valve shall be provided at the following locations:

(1) On each bank of a river, pond, or lake where a main crosses water

(2) Outside the building foundation(s) where a main or a section of a main is installed under a building

(3) On the underground line where there are two sources of water, after every two fire hydrants or building fire sprinkler connections

10.10.2.4.1.1 Minimum flow from fire hydrant – CC

10.10.2.4.1.1 Minimum Hydrant Flow. Each hydrant shall be flow tested and shall flow a minimum of 1,500gpm (5,678 L/m).

22.5.1.3 Earthquake protection for above ground storage tanks – CC

22.5.1.3 In areas subject to earthquakes, tank supports and connections shall be designed to resist damage as a result of such shocks.

22.5.1.3.1 Supports shall be cross connected no greater than 9” from top of support.

22.5.1.3.2 In addition to cross connections, each tank support is to be individually braced to structure. Two shall run perpendicular and two shall run parallel to tank.

22.5.1.3.3 Bracing attachments shall be connected at or above connection of cross connection.

22.5.1.3.4 Bracing for tank supports shall comply with bracing methods per NFPA 13.

13.4.1.2 Vent pipe systems – SN

13.4.1.2 Vent Pipe Systems. Pressure relief devices shall be piped to the outdoors where the discharge will not impinge on the structure, personnel, or means of egress and will not create a hazardous concentration of carbon dioxide. The termination point of pressure relief vent discharge piping shall be outdoors and a minimum of 10 feet from operable openings into the building.

7.2.1 Minimum required documentation – SN

7.2.1* Where documentation is required by the authority having jurisdiction, the following list shall represent the minimum documentation required for new systems and additions or alterations to existing systems:

(1)* Written narrative providing intent and system description

(2) Riser diagram

(3) Floor plan layout showing locations of all devices, control equipment, and supervising station and shared communications equipment with each sheet showing the following:

- (a) Point of compass (north arrow)
- (b) A graphic representation of the scale used
- (c) Room use identification (e.g. room, name and number)
- (d) Building features that will affect the placement of initiating devices and notification appliances
- (e) Reflected ceiling plan when ceiling mounted detectors are used
- (f) Ceiling height(s) and appliance mounting height(s) when ceiling mounted notification appliances are used
- (g) Ambient environment conditions (e.g., temperature, humidity, etc.) that will affect the operation of control equipment, initiating devices or notification appliances, when required by the AHJ

(4) Sequence of operation in either an input/output matrix or narrative form

(5) Equipment technical data sheets

(6) Manufacturers' published instructions, including operation and maintenance instructions

(7) Battery capacity and safety margin calculations (where batteries are provided)

(8) Voltage drop calculations for notification appliance circuits

(9) Mounting height elevation for wall-mounted devices and appliances

(10) Where occupant notification is required, minimum sound pressure levels that must be produced by the audible notification appliances in applicable covered areas. Provide a chart showing areas where the ambient sound levels exceed 65dB where public mode is used and all the ambient sound levels for all areas where private mode is used.

(11) Locations of alarm notification appliances, including candela ratings for visual alarm notification appliances

(12)* Pathway diagrams between the control unit and shared communications equipment within the protected premises

(13) Completed record of completion in accordance with 7.5.6 and 7.8.2

(14) For software-based systems, a copy of site-specific software, including specific instructions on how to obtain the means of system and software access (password)

(15) Record (as-built) drawings

(16) Records, record retention, and record maintenance in accordance with Section 7.7

(17) Completed record of inspection and testing in accordance with 7.6.6 and 7.8.2

(18) Intelligibility floor plans when required by the AHJ, must indicate graphically and in tabular form each acoustically distinguishable space (ADS) as described in Annex D. The ADS's and areas to be tested for intelligibility shall be approved by the AHJ

(19) AHJ notes

(20) Addressable device list with descriptions or conventional zone list with descriptions

10.4.4 Control equipment mounting – SN

10.4.4* Unless otherwise permitted by the authority having jurisdiction, control unit displays, visible indicators, or controls shall be mounted such that the distance to the highest switch, lamp, or textural display does not exceed 6 ft (1.8m) above the finished floor, and the lowest switch, lamp, or textual display shall not be less than 40 in. (1018 mm) above the finished floor. This does not apply to Remote Power Supply (RPS) panels.

10.4.5.1 Detectors above dedicated function control units – SN

10.4.5.1* Unless required by the authority having jurisdiction, smoke or heat detector(s) shall not be installed at the location of dedicated function(s) fire alarm control unit(s).

12.2.3 Fire alarm wiring in conduit – SN

12.2.3 The installation of all pathway wiring, cable, and equipment shall be in accordance with NFPA 70 and the applicable requirements of 12.2.3.1 through 12.2.3.4. In all occupancies, other than residential two stories or less, all wiring, including optical fiber cables, shall be in enclosed metallic conduit or shall be MI, MC or AC cable. Residential two stories or less occupancies shall still be provided protection in accordance with NFPA 70 Section 760.53 (A)(2) where cable passes through a floor or wall (7 ft) above the floor.

18.3.7.3 Voltage drop calculation requirements – SN

18.3.7.3 Voltage drop calculations shall be provided for new installations and existing circuits where circuit modifications include the addition of new appliances, any increase in existing appliance current draws, or where a circuit is extended by more than ten feet.

18.3.7.3.1 Unless otherwise specified by manufacturer's documentation, starting voltage (V_S) shall be 20.4VDC and end of line voltage (V_{EOL}) shall be a minimum of 16VDC. The calculated voltage drop (V_D) shall comply with either 18.3.7.3.3 or 18.3.7.3.4.

$$V_{EOL} = V_S - V_D \qquad [18.3.7.3.1]$$

Where:

$\mathbf{V_{EOL}}$ = Voltage at end of line (volts)

$\mathbf{V_S}$ = Starting voltage (volts)

$\mathbf{V_D}$ = Calculated voltage drop (volts)

18.3.7.3.1.1 For addressable notification appliances listed to nominal 29VDC, starting voltage shall be 85% of the battery power supply voltage, and the minimum voltage at the appliance shall be 23VDC. The calculated voltage drop (V_D) shall comply with either 18.3.7.3.3, 18.3.7.3.4, or manufacturer calculation instructions.

18.3.7.3.2 Where a modified circuit contains existing appliances with no published UL Max current draws the maximum voltage drop (V_D) shall not exceed two volts.

18.3.7.3.3 End Line Loading (ELL) Method. The calculated voltage drop using the End Line Loading Method shall be determined from either equation 18.3.7.3.3a or 18.3.7.3.3b. Wire Resistance (R) & Conductor Area (CM) shall be taken from Table 18.3.7.3.3a. Specific Resistance (K) shall be taken from Table 18.3.7.3.3b. Appliance current draws (I) shall be the manufacturer's published UL Max current draws.

$$V_D = \frac{2 * R * I_T * L_T}{1000} \qquad [18.3.7.3.3a]$$

$$V_D = \frac{2 * K * I_T * L_T}{CM} \qquad [18.3.7.3.3b]$$

Where:

$\mathbf{V_D}$ = Calculated voltage drop (volts)

$\mathbf{R}$ = Wire resistance (ohms/kFt)

$\mathbf{I_T}$ = Total amperage load of circuit (amps)

$\mathbf{L_T}$ = Total circuit length between panel and end of line (ft)

$\mathbf{K}$ = Specific resistance (ohm-cmil/ft)

$\mathbf{CM}$ = Conductor area (cmil)

Table 18.3.7.3.3a Copper Wire Properties

Wire Size	R Resistance (ohms/kFt at 75°C 1-Strand (Solid)	R Resistance (ohms/kFt at 75°C 7-Strand (Stranded)	CM Conductor area (cmil)
12 AWG	1.93	1.98	6530
14 AWG	3.07	3.14	4110
16 AWG	4.89	4.99	2580
18 AWG	7.77	7.95	1620

Table 18.3.7.3.3b Specific Resistance of Copper

K Specific Resistance (ohm-cmil/ft at 75°C)
12.90

18.3.7.3.4 Point to Point (PTP) Method. The calculated voltage drop using the Point to Point Method shall be determined from equations 18.3.7.3.4a and either 18.3.7.3.4b or 18.3.7.3.4c. Wire Resistance (R) & Conductor Area (CM) shall be taken from Table 18.3.7.3.3a. Specific Resistance (K) shall be taken from Table 18.3.7.3.3b. Notification appliance current draws (I) shall be the manufacturer's published UL Max current draws.

$$V_D = V_{D_1} + V_{D_2} + V_{D_3} + \cdots + V_{D_n} \qquad [18.3.7.3.4a]$$

A voltage drop is calculated between each appliance along the circuit. There are “n” appliances on a circuit.

$$V_{D_i} = \frac{2 * R * I_P * L_P}{1000} \qquad [18.3.7.3.4b]$$

$$V_{D_i} = \frac{2 * K * I_P * L_P}{CM} \qquad [18.3.7.3.4c]$$

Where:

$\mathbf{V_D}$ = Sum of calculated voltage drops (volts)

$\mathbf{V_{D_i}}$ = Calculated voltage drop between the previous appliance[1] and the current appliance (amps)

$\mathbf{R}$ = Wire resistance (ohms/kFt)

$\mathbf{I_P}$ = Sum of all current draws from the current appliance to the end of line appliance (amps)

$\mathbf{L_P}$ = Length of wire between the previous appliance[1] and the current appliance (ft)

$\mathbf{K}$ = Specific resistance (ohm-cmil/ft)

$\mathbf{CM}$ = Conductor area (cmil)

Note #1 where the current appliance is the first appliance on the circuit, the “previous appliance” is the panel.

18.3.7.4 Audio power loss calculation requirements – SN

18.3.7.4 Audio Notification Appliance Circuits. Power loss calculations shall be provided for new installations and for existing circuits where circuit modifications increase the power (watts) demand or where a circuit is extended by more than ten feet.

18.3.7.4.1 Power loss shall be determined from either equation 18.3.7.4.1a or 18.3.7.4.1b and shall be limited to a 0.5dB loss. Wire Resistance (R) & Conductor Area (CM) shall be taken from Table 18.3.7.3.3a. Specific Resistance (K) shall be taken from Table 18.3.7.3.3b.

$$P_{LOSS} = 20 * \log\left[\frac{\frac{V^2}{P}}{\frac{V^2}{P} + \frac{2 * R * L}{1000}}\right] \quad [18.3.7.4.1a]$$

$$P_{LOSS} = 20 * \log\left[\frac{\frac{V^2}{P}}{\frac{V^2}{P} + \frac{2 * K * L}{CM}}\right] \quad [18.3.7.4.1b]$$

Where:

$\mathbf{P_{LOSS}}$ = Power loss (dB)

$\mathbf{V}$ = Amplifier voltage (volts)

$\mathbf{P}$ = Total wattage draw on the circuit (watts)

$\mathbf{R}$ = Wire resistance (ohms/kFt)

$\mathbf{L}$ = Total circuit length between panel and end of line (ft)

$\mathbf{K}$ = Specific resistance (ohm-cmil/ft)

$\mathbf{CM}$ = Conductor area (cmil)

18.3.7.5 Existing circuiting requirements – SN

18.3.7.5 Where notification appliance circuits are calculated, plans shall show to an indicated scale the entirety of each circuit including all appliance locations and settings, even for existing circuits where any portion of the circuit is outside of the proposed work area.

18.4.1.6 Voice message audibility requirements – CC

18.4.1.6* Voice messages shall not be required to meet the audibility levels of 90 dBA in mechanical equipment rooms and 80 dBA in other occupancies as required by Section 907.5.2.1.1 of the IFC, but shall be required to meet audibility requirements of 18.4.4 (Public Mode Audible Requirements), 18.4.5 (Private Mode Audible Requirements), 18.4.6 (Sleeping Area Requirements), or 18.4.7 (Narrow Band Tone Signaling for Exceeding Masked Thresholds), and shall meet the intelligibility requirements of 18.4.11 where voice intelligibility is required.

18.4.2.5 Audible synchronization – SN

18.4.2.5* The standard evacuation signal shall be synchronized within a notification zone.

Exception: Where a portion of a room or space is remodeled and new or existing audible devices are within the area of the remodel, such audible devices are required to synchronize with each other but are not required to synchronize with existing audible devices within the notification zone if the existing audible devices are outside of the remodel area.

18.5.5.7.2 Visual synchronization – SN

18.5.5.7.2 Visual notification appliances shall be installed in accordance with Table 18.5.5.7.1(a) or Table 18.5.5.7.1(b) using one of the following:

(1) A single visual notification appliance.

(2)* Two groups of visual notification appliances, where visual notification appliances of each group are synchronized, in the same room or adjacent space within the field of view. This shall include synchronization of visual appliances operated by separate systems.

(3) More than two visual notification appliances or groups of synchronized appliances in the same room or adjacent space within the field of view that flash in synchronization.

Exception: Where a portion of a room or space is remodeled and new or existing strobes are within the area of the remodel, such strobes are required to synchronize with each other but are not required to synchronize with existing strobes in the field of view if the existing strobes are outside of the remodel area and were installed prior to the adoption of the 1996 edition of NFPA 72.

18.5.5.9.2.1 Endorsement of strobe PBD – SN

18.5.5.9.2.1 Documentation provided to the authority having jurisdiction shall be stamped by a Nevada licensed engineer or prepared by a NICET Level IV fire alarm designer and shall include the inverse square law calculations using each of the vertical and horizontal polar distribution angles in UL 1638, Visible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories, or equivalent.

18.5.5.11 Ceiling mount visual notification requirements – SN

18.5.5.11 Ceiling-mounted visual notification appliances shall be provided in rooms and areas used for exhibition purposes, or in rooms and areas where racks or shelving that exceed 5 feet in height are expected to be installed, or in rooms and areas where wall-mounted appliances may become obstructed.

21.7.9 HVAC shutdown method – SN

21.7.9 Where duct detectors are installed in accordance with Uniform Mechanical Code Section 609.1, automatic shut-off shall be accomplished by interrupting the power source or utilizing the stop input, if provided on the air moving equipment.

23.2.2.4 Permit requirements for software and firmware changes – SN

23.2.2.4 A permit is required prior to making any changes, except room label changes.

23.8.5.1.3 Dedicated function fire alarm systems pull stations – SN

23.8.5.1.3 A pull station in accordance with 23.8.5.1.2 shall not be installed in *Dedicated Function Fire Alarm Systems*.

23.8.5.9.1 Signal type for pump supervision – SN

23.8.5.9.1 Where fire pumps are required to be monitored and a building fire alarm system is installed, a pump running signal shall be a supervisory signal.

23.8.5.9.3 Supervision of fire pumps, fire alarm systems – SN

23.8.5.9.3 Where fire pumps are required to be monitored and a building fire alarm system is installed, the fire alarm system shall monitor all fire pump signals required at a constantly attended location in accordance with NFPA 20.

23.8.5.9.4 Supervision of fire pumps, sprinkler monitoring systems – SN

23.8.5.9.4 Where fire pumps are required to be monitored and a sprinkler monitoring system is installed, then the sprinkler monitoring system shall monitor all fire pump signals required at a constantly attended location in accordance with NFPA 20. The sprinkler monitoring system shall monitor the signals required by 2022 NFPA 20 Section 10.4.7 2 (electric pumps) and 2022 Section NFPA 20 12.4.2.3 (diesel pumps).

23.8.6.3.2 Notification zones, fire alarm systems – SN

23.8.6.3.2 The boundaries of fire alarm notification zones shall be coincident with building outer walls, fire walls, fire barriers, or other fire-resistance rated horizontal assemblies. Sprinkler systems serving a notification zone shall not cross over into another notification zone. For high-rise buildings, alarms shall activate on the floor of, floor below, and floor above the floor of incidence. For all other buildings, alarms shall activate throughout the notification zone of incidence.

24.4.9.4 Notification zones, emergency communication systems – SN

24.4.9.4 The boundaries of notification zones shall be coincident with building outer walls, fire walls, fire barriers, or other fire-resistance rated horizontal assemblies. Sprinkler systems serving a notification zone shall not cross over into another notification zone. For high-rise buildings, alarms shall activate on the floor of, floor below, and floor above the floor of incidence. For all other buildings, alarms shall activate throughout the notification zone of incidence.

24.9 Two-way radio communications enhancement systems – SN

24.9* Two-Way Radio Communications Enhancement Systems. All in-building two-way radio communications enhancement systems shall be designed, installed, and maintained in accordance with NFPA 1225 and the *Clark County Fire Department Guideline for Emergency Responder Communications Enhancement Systems Permitting, Testing, & Recertification*.

24.10.13.3 Two-way communications system signage – SN

24.10.13.3 Signage including all required information shall be durable and permanently affixed in a manner acceptable to the authority having jurisdiction. Temporary signs, stickers, or easily removable labels shall not be utilized.

2021 NFPA 160

7.1.6 Flame effect separation distance – CC

7.1.6 The separation distance between the flame effect and the audience shall be a minimum of 15 feet.

Separation distances less than 15 feet can be requested by conducting in field measurements and exposure analysis in the desired display location by of a use radiometer to determine incident thermal radiation to proximate effects, proximate exposures, direct exposures, proximate flammable/combustible materials and surface temperature of the exposed skin of a member of the audience which shall not exceed 111ºF (44ºC). Incident radiation shall be measured with a radiometer. Skin temperature may also be measured with an infrared surface temperature thermometer or other equivalent means.

8.1.2 Fire performer qualifications – CC

8.1.2 The operator or fire performer shall demonstrate competency by experience and training or by holding a license acceptable to the AHJ. The operator or fire performer be licensed in accordance with NRS 477, and NAC 477.

2022 NFPA 409

Deletion of performance-based design provisions – CC

1.3 Application. This section is deleted from NFPA 409.

1.3.1 This section is deleted from NFPA 409.

4.1 Fire Protection Approaches. All sections of chapter 4 are deleted from NFPA 409.

5.1 Performance-Based Design Approach. All sections of chapter 5 are deleted from NFPA 409.

7.1.1 This section is deleted from NFPA 409.

7.12.2.13 This section is deleted from NFPA 409.

7.18.7 This section is deleted from NFPA 409.

8.1.1.1 This section is deleted from NFPA 409.

8.2.1.3 This section is deleted from NFPA 409.

9.1.1.1 This section is deleted from NFPA 409.

11.14.1.1 This section is deleted from NFPA 409.

2022 NFPA 1123

3.3.45 Pyrotechnic professional – CC

3.3.45 Pyrotechnic Professional. A person who has demonstrated proficiency and knowledge of applicable NFPA 1123, NFPA 1126, NFPA fireworks display, and proximate pyrotechnic standards via documented training and experience in the use of fireworks, pyrotechnic special effects materials, or professional-use-only products.

10.1.1 Pyro operator requirements – CC

10.1.1 The operator shall be a Pyrotechnic Professional and shall be at least 21 years old and licensed or approved by the AHJ in accordance with any and all appliable federal, state, and local laws. All operators shall be licensed in accordance with NRS 477, and NAC 477.

2021 NFPA 1126

3.3.53 Pyrotechnic professional – CC

3.3.53 Pyrotechnic Professional. A person who has demonstrated proficiency and knowledge of applicable NFPA 1123, NFPA 1126, NFPA fireworks display, and proximate pyrotechnic standards via documented training and experience in the use of fireworks, pyrotechnic special effects materials, or professional-use-only products.

6.5.1 Pyro operator requirements – CC

6.5.1 All pyrotechnic operators shall be Pyrotechnic Professionals and shall be at least 21 years old and licensed or approved by the authority having jurisdiction in accordance with any and all applicable laws. All pyrotechnic operators shall be licensed in accordance with NRS 477, and NAC 477.

8.1.2.3 Pyro operator requirements – CC

8.1.2.3 Indoor pyrotechnic displays shall only be permitted in venues provided with automatic fire sprinklers throughout.

8.2.13 Airbursts over audience – CC

8.2.13 Pyrotechnic special effects shall not be permitted to be shot over the heads of spectators, over egress aisles or exit pathways due to the potential for hazardous debris and fallout caused by those devices. This restriction will apply to devices such as: airbursts, gerbs, comets, mines, line rockets, and any other similar types of effects that utilize a pyrotechnic charge.

> **Exception:** Where approved by the authority having jurisdiction, special consideration may be provided with adequate ceiling heights and testing of specific devices in specific locations.

18.12.3.3 Backbone cabling requirements, sprinklered building – SN

18.12.3.3 Backbone cables and backbone cable components installed in buildings that are fully protected by an automatic sprinkler system in accordance with NFPA 13 shall comply with 18.12.3.4.

18.12.3.4 Backbone cabling requirements, nonsprinklered building – SN

18.12.3.4* Backbone cables and backbone cable components installed in buildings shall be protected from attack by fire in accordance with one of the following:

(1) Use a cable with a listed fire-resistance rating in accordance with the following:

(a) Where the primary structural frame of a building is required to have a fire-resistance rating of 2 hours or more or is classified as heavy timber construction, the minimum fire-resistance rating shall be 2 hours.

(b) Where the primary structural frame of a building is required to have fire-resistance rating of less than 2 hours, the minimum fire-resistance rating shall be 1 hour.

(c) Where the primary structural frame of a building does not require a fire-resistance rating, a fire resistance rating shall not be required.

(2) A protected enclosure or area shall have a fire-resistance rating in accordance with the following:

(a) Where the primary structural frame of a building is required to have a fire-resistance rating of 2 hours or more or is classified as heavy timber construction, the minimum fire-resistance rating shall be 2 hours.

(b) Where the primary structural frame of a building is required to have a fire-resistance rating of less than 2 hours, the minimum fire resistance rating shall be 1 hour.

(c) Where the primary structural frame of a building does not require a fire-resistance rating, a fire resistance rating shall not be required.

2022 NFPA 2001

7.1.8.3 Enclosure pressure relief – CC

7.1.8.3 For clean agent systems that utilize inert gases as the extinguishing agent, a licensed engineer or a NICET Level IV special hazards designer shall provide a report which includes the pressure relief vent area calculations and includes the design of the overall ventilation system serving the enclosure(s) in order to ensure that the ventilation system will prevent over-pressurization and potential structural damage to the enclosure(s).

9.1.1.6 Releasing control panel requirements – SN

9.1.1.6 Releasing control panels shall be addressable type. The alphanumeric display shall state the device type, the floor level (if applicable), the device address and a descriptive location for the operated device(s).

> **Exception:** Conventional type releasing panels utilizing no more than ten non-addressable automatic initiating devices may be utilized when approved by the authority having jurisdiction.

9.5.6 Notification appliances – SN

9.5.6 Appliances used for occupant notification shall be labeled “AGENT” or be otherwise differentiated from building fire alarm and sprinkler notification appliances by other means approved by the authority having jurisdiction. Where visual notification is provided, agent strobes shall be provided with blue colored lenses unless otherwise approved by the authority having jurisdiction.