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CHAPTER 1

SCOPE AND ADMINISTRATION

SECTION 101

SCOPE AND GENERAL REQUIREMENTS

Sections 101.1 Title 101.2 Scope and 101.3 Intent are replaced as follows:

101.1 Title. These regulations shall be known as, and may be cited and referred to as the Fire Code, or the Fire Code of the City of Englewood. It may be referred to herein as “this code” or “the code,” in both upper and lower case. The terms “Englewood” and “City” are understood to mean the City of Englewood.

101.2 Scope. This code establishes regulations affecting or relating to structures, processes, premises, and safeguards including, but not limited to:

1. Inspection of permanent and temporary buildings, processes, equipment, systems, and other fire- and safety-related situations, at intervals established by the fire code official but not to exceed once every 12 months.
2. Investigation of fires, explosions, hazardous materials incidents, and other related emergency events; the fire department shall be responsible for fire/explosion cause determination and subsequent investigation.
3. Recovery of City costs related to emergency response incidents, including the mitigation of hazardous materials incidents; nuisance alarms; problematic systems; fire safety inspections; systems testing; re-inspections; re-testing; investigations; emergency fire watch assigned to private properties, etc.
4. Storage, use, processing, handling, production and transportation of hazardous materials.
5. Storage, use, processing, handling, production and transportation of flammable and combustible gases, liquids, and solids.
6. Interior finish, decorations, furnishings, and other combustibles that contribute to fire spread, fire load, and smoke production in all occupancies.
7. Hazards from interior fires in trash, excessive storage of combustibles, production of chemical material, and other materials that pose an exposure hazard to adjacent property in all occupancies including single-family residences.
8. Hazards from outside fires in vegetation, trash, storage, vehicles, combustible and flammable materials, building debris, fencing, and other materials.
9. Regulation and control including assignment of fire watch personnel, of special events including, but not limited to, assemblage of people, exhibits, trade shows, amusement parks, haunted houses, outdoor events, livestock events, large sporting events, and other similar special temporary and permanent occupancies.
10. Existing occupancies and conditions.
11. Maintenance and testing of all fire- and life-safety systems.
12. Access and water supply requirements for Fire Department operations.
13. Review of design plans and construction documents including drawings, calculations and specifications for the design and construction of new buildings, and alterations, additions and repairs of existing buildings.
14. Review of design plans and construction documents including drawings, calculations and specifications for the installation, alteration, addition and repair of life- and fire-safety systems, equipment, features, components, devices and apparatus including but not limited to fire protection systems, Fire Department access, water supply, flammable and combustible materials, storage, production and use of hazardous materials, commercial processes.

15. Fire and life safety education of fire brigades, employees, responsible parties, and the general public including the review and approval of emergency procedures for all occupancies and evaluation of fire drills.
16. Control of emergency operations and scenes.
17. Conditions affecting firefighter safety.
18. Licensing certification of firms/designers/installers/inspectors/testers of life safety systems equipment referenced in this code and standards and property managers, etc., responsible for the safety of others.
19. Review of design plans, construction documents and shop/layout drawings for the installation, alteration, modification and repair of conveyances.
20. Inspection of conveyances.
21. Review of design plans, construction documents and process systems for the growing, retail and medical sales, extraction, enrichment and infusing of marijuana and by-products.
22. Inspection of facilities used for the growing, retail and medical sales, extraction, enrichment and infusing of marijuana.

The provisions of this code shall supplement any and all laws relating to fire- and life-safety and shall apply equally to all of the following without restriction: persons, firms, corporations, the government of the United States of America, the government of the State of Colorado, the government of the City of Englewood, and all agencies, subdivisions, and departments thereof. The provisions of this Code shall apply to existing conditions as well as to conditions arising after the adoption of the Code.

101.2.1 Appendices. Provisions in the appendices shall apply as noted by the Appendix Adoption Status.

101.3 Intent. The purpose of this code is to establish the minimum requirements, consistent with nationally recognized good practice, for providing a reasonable level of occupant and pedestrian fire- and life-safety and property protection from the hazards of fire, explosion, production, use, and handling of dangerous and hazardous materials, substances, and devices, or dangerous conditions in new and existing buildings, structures, and premises, and to provide safety to firefighters and emergency responders during emergency operations.

SECTION 102 APPLICABILITY

Sections 102.7 Referenced codes and standards and 102.8 Subjects not regulated by this code are replaced as follows:

102.7 Referenced codes and standards. Additional details regarding processes, methods, specifications, equipment testing and maintenance, or other pertinent criteria contained in these standards and codes listed in Chapter 80 of this Code shall be considered a part of this Code. Volumes 1 through 18 of the National Fire Codes are standards to this code. Where the "*International Electrical Code*," and "ICC Electrical Code," are referenced this shall instead be "*National Electrical Code (NEC) / NFPA 70.*"

Exception: National Fire Protection Association standards identified in Chapter 80 Referenced Standards as recommendations.

102.8 Subjects not regulated by this code. Where no applicable codes, standards, or requirements are set forth in this Code or contained within other laws, codes, regulations, ordinances, or bylaws adopted by the City of Englewood Fire Marshal's Office, compliance with the applicable codes and standards of the National Fire Protection Association (NFPA) or other nationally recognized and approved standards shall be deemed as prima facie evidence of compliance with the intent of this code. Nothing herein shall derogate from the authority of

the City of Englewood Fire Marshal's Office to determine compliance with codes or standards for those activities or installations within the City of Englewood's jurisdiction or responsibility.

SECTION 103

DEPARTMENT OF FIRE PREVENTION

Sections 103.1.1 Division of Fire Prevention and Investigation Division and 103.1.2 Rules and regulations are added as follows:

103.1.1 Division of Fire Prevention. The Fire Marshal's Division is established within the Police Department of the City of Englewood under the direction of the Fire Marshal. This position is and may be referred to as the "Fire Code Official," "Fire Official," and "Fire Marshal," in both upper and lower case. This code shall be administrated and enforced by the Fire Code Official.

103.1.2 Rules and regulations. The Fire Official shall have the full power to adopt, in reference to this Code, any rules, restrictions, or measures that may be advisable.

Section 103.3 Deputies is replaced as follows:

103.3 Deputies. In accordance with the prescribed procedures of the City of Englewood and with the concurrence of the Chief, the Fire Code Official shall have the authority to appoint a Deputy Fire Code Official, Chief Fire Protection Engineer, Fire Protection Engineers, other related technical officers, fire inspectors, fire investigators, and employees. Their duties shall be those outlined by the Fire Code Official.

SECTION 104

GENERAL AUTHORITY AND RESPONSIBILITIES

Section 104.1 General is replaced as follows:

104.1 General. The Fire Code Official is hereby authorized to inspect land, buildings, structures, utilities, installations, equipment, devices, legal and illegal processes, and materials for fire, explosion, and other emergency hazards, releases of hazardous materials, false alarms, any unsafe conditions that relate to the protection of the public and/or property and other emergencies. The fire code official shall have the authority to investigate fire protection and other life safety systems that are disabled or not functioning. The Fire Code Official shall also have the authority to control the use, location, and transportation of flammable or combustible liquids or acids (in a chemical or physical state) or hazardous materials; the issuance of permits; the issuance of notices, orders, or City of Englewood Municipal Court summonses for the correction or immediate abatement of hazardous situations; the enforcement of this code and other laws, ordinances, rules, and regulations, which are within the perspective of this Code and standards.

Section 104.3 Right of entry is replaced as follows:

104.3 Right of entry. Whenever it is necessary to make an inspection to enforce the provisions of this code, or whenever the fire code official has reasonable suspicion to believe there exists in a building or upon any premises, any vehicle, or any vessel, any conditions or violations of this code that make the premises, vehicle, or vessel unsafe, dangerous, or hazardous, the Fire Code Official shall have the authority to enter the building, vehicle, or vessel to conduct an inspection and, if necessary, an investigation, taking photographs of unsafe, dangerous, or hazardous conditions or for investigative or fire investigation purposes or the pursuance of any other emergency, or to perform the duties upon the Fire Code Official by this code. If such building, premises, or vehicle is occupied, the Fire Code Official shall present credentials to the occupant and request entry. If such building, premises, or vehicle is unoccupied, the fire code official shall first make a reasonable effort to locate the owner or

other person having charge or control of the building or premises and request entry. If entry is refused, the Fire Code Official has recourse to every remedy provided by law to secure entry.

Sections 104.3.2 Interference with enforcement and 104.3.3 Power to protect property are added:

104.3.2 Interference with enforcement. Persons shall not interfere or cause conditions that would interfere with the Fire Code Official carrying out any duties or functions prescribed by this code.

104.3.3 Power to protect property. The Fire Code Official shall have power to cause the removal of any property when necessary to preserve such property from fire, explosion, or other emergency; to prevent the spreading of fire; or to protect adjoining property. No person shall be entitled to remove any property in the possession of the fire code official saved from any fire until proof of ownership thereof is furnished.

Section 104.4.1 Impersonation is added:

104.4.1 Impersonation. Persons shall not use a badge, uniform, or other credentials to impersonate a Fire Code Official - prevention, engineering or investigation.

Section 104.6.2.1 Frequency of inspections is added:

104.6.2.1 Frequency of inspections. Fire safety inspections for the specific property/operation shall be required at intervals established by the Fire Code Official but not to exceed once every 12 months.

Section 104.6.3 Fire records is replaced:

104.6.3 Fire records. The Denver Fire Department shall keep a record of all fires, explosions, and other emergencies occurring within its jurisdiction and of facts concerning the same, including reports (including investigation reports), photographs, videos, and statistics as to the extent of such fires and the damage or injury caused thereby, together with other information as required by the fire code official. All records related to a property shall be maintained for the life of the property. All other records shall be maintained for no less than seven (7) years.

Section 104.6.3.1 Fire loss information is added:

104.6.3.1 Fire loss information. It shall be the responsibility of any person suffering a fire, explosion, building collapse, or other emergency resulting in injury(s) to persons and/or property loss within the City of Englewood to report the incident and to provide the Fire Code Official in writing with the dollar value of the resulting loss within ten (10) days of the loss. If insured, the person may provide the name and address of the insurance company, in which case the insurance company shall supply the final loss figures to the Fire Code Official.

Section 104.7.2 Technical assistance is replaced:

104.7.2 Technical assistance. To determine the acceptability of technologies, processes, products, facilities, materials and uses attending the design, operation or use of a building or premises subject to inspection by the Fire Code Official, the Fire Code Official is authorized to require the owner or agent to provide, without charge to the jurisdiction, a technical opinion and report. The opinion and report shall be prepared by a professional engineer licensed by the state of Colorado and acceptable to the Fire Code Official. The opinion and report shall analyze the fire safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to recommend necessary changes. Whenever the technical opinion and report is required for existing technology, processes, life safety system(s), products, facilities, materials, and uses attending the design, operation or use of a building or premises, the opinion and report shall evaluate compliance of all components/equipment to listing and code requirements.

Section 104.7.2.1 Final determination is added:

104.7.2.1 Final determination. The Fire Code Official shall make the final determination as to whether the provisions of this code have been met.

Sections 104.8.1 Application for modification and 104.8.2 Compliance with code are added:

104.8.1 Application for modification. The Fire Code Official is authorized to modify any of the provisions of this code upon application in writing by the owner where there are practical difficulties in carrying out the provisions of the Code, provided the intent of the code shall be complied with, public safety secured, and substantial justice done.

104.8.2 Compliance with code. Buildings with equivalency, alternative, or modification approved by the Building Code Official and Fire Code Official shall be considered conforming to the code.

Sections 104.9.3 Fire protection features and 104.9.4 Building Code are replaced:

104.9.3 Fire protection features. Each application for an alternate fire protection feature shall be filed with the Fire Code Official and shall be accomplished by such evidence, letters, statements, test results, or other supporting information as required to justify the request. The Fire Code Official shall keep a record of actions on such applications, and a signed copy of the Fire Code Official's decision shall be provided for the applicant.

104.9.4 Building Code. Whenever the alternate material or method involves matters regulated by the Fire Code and Building Code, approvals are also subject to approval of the Building Code Official.

Sections 104.10 Fire investigations and 104.10.1 Release of hazardous materials are added:

104.10 Fire investigations. The City of Englewood Fire Code Official and the Denver Fire Department are authorized to investigate without delay the cause, origin, and circumstances of each and every fire or explosion or intent to commit such an act occurring within the City of Englewood involving the loss of life or injury to a person or destruction or damage to property and, if it appears to the fire investigators that such fire or explosion is of suspicious origin, the investigators are authorized to take immediate charge of all physical evidence relating to the intent or cause of the fire and are authorized to pursue the investigation to its conclusion.

104.10.1 Release of hazardous materials. The Fire Code Official is authorized to investigate the cause, origin, and circumstances of unauthorized releases of hazardous materials. The Fire Code Official is authorized to recover from the responsible party(s) all costs incurred by the City for mitigation, rendering the release harmless to people or property, including personnel and equipment, securing the incident scene, removal of materials released and cleanup.

Sections 104.10.2 Authorization of the Englewood Police Department and Denver Police Department, 104.10.3 Limiting access, and 104.10.4 Interference with enforcement are added:

104.10.2 Authorization of Englewood Police and Denver Police Department. The Englewood Police Department and/or Denver Police Department are authorized to assist the Fire Department in any investigation when requested to do so by the Fire Chief, or the Fire Code Official.

104.10.3 Limiting access. The Fire Department or Fire Code Official shall have the authority to limit access to buildings, property, vehicles, vessels, or other similar conveyances by any vehicle, vessel, or person during an investigation.

104.10.4 Interference with enforcement. Persons shall not interfere, nor cause conditions that would interfere with, the Fire Code Official, or Fire Investigator carrying out any duties or functions, including arrest of suspects, prescribed by this Code.

Section 104.11.1.1 Scene barrier is added:

104.11.1.1 Scene barrier. The incident commander, or Fire Code Official in charge of an emergency scene shall have the authority to establish barriers to control access in the vicinity of such emergency and to place, or cause to be placed, ropes, guards, barricades, or other obstructions across any public or private street or alley, to delineate an emergency scene barrier(s). No person, except as authorized by the incident commander, or Fire Code Official in charge of the emergency, shall be permitted to cross barriers established in accordance with Sections 104.11.1 and this section. Whenever the emergency incident involves private property, the owner of said property shall be responsible for all costs related to placement, rental and use of barricades; all costs incurred by the City for mitigation, rendering the scene harmless to people or property, and removal of equipment and materials and cleanup.

Section 104.11.3.1 Resetting or silencing of alarms is added:

104.11.3.1 Resetting or silencing of alarms. No person shall reset or silence a system unless by direction of the Fire Code Official or Fire Department Official in charge of the incident.

Section 104.11.4 Emergency power to demolish buildings and 104.11.5 Cost recovery are added:

104.11.4 Emergency power to demolish buildings. When a fire is in progress, the Fire Code Official, or the officer in charge of the fire, may order any building that is in close proximity to such fire to be torn down, blown up, or otherwise disposed of for the purpose of checking the conflagration. The property owner shall be responsible for all costs related to all operations.

104.11.5 Cost recovery. The property owner shall be responsible for all costs related to placement, rental and use of barricades.

Section 104.12 Unsafe buildings, structures or utilities is added:

104.12.1 Notice and abatement. If, after inspection by the Fire Code Official, the building, structure or utility is determined to be unsafe by the Fire Code Official, it shall be abated by repair, replacement, removal or demolition upon notice by the Fire Code Official. If the building or structure has common property line walls, then the Fire Code Official shall notify the adjacent building owners that their building may be unsafe and may require repair or reinforcement.

104.12.2 Buildings or structures. In the case of an unsafe building or structure, the Fire Code Official may order such building or structure, or any buildings or structures placed in jeopardy by the unsafe building or structure, vacated immediately. When necessary to protect life, property, health and public welfare, the Fire Code Official may cause to have posted signs, which shall prohibit entry into an unsafe building or structure. However, with permission of the Fire Code Official, it shall be lawful to enter the unsafe building or structure for the purpose of effecting any required repairs, rehabilitation or demolition; or by members of the Fire Department. The signs shall be provided and attached to the building or structure by the Fire Code Official and shall read, in addition to other information, **"UNSAFE - DO NOT ENTER."**

104.12.3 Utilities. In the case of an unsafe utility, the Fire Code Official shall cause to be affixed an approved warning tag on the unit declared to be unsafe. The Fire Code Official shall order the unsafe utility disconnected or its use discontinued until the unsafe condition is abated. In addition, the Fire Code Official may order any building, structure or utility which is placed in jeopardy by the unsafe utility to be vacated and/or disconnected, and these shall not be reoccupied or reconnected until declared safe by the Fire Code Official. It shall be

unlawful for anyone to mark any unsafe utility, as herein defined, with any type markings or tags declaring them to be unsafe, except as authorized by the Fire Code Official.

104.12.4 Demolition or securing by the City. If the owner and/or occupant of an unsafe building, structure or utility fails to perform the repairs, rehabilitation, securing or removal required by an order within the time specified therein or any extension of time to comply with said order, the Fire Code Official may, as set forth in this Section, cause the demolition or securing of the unsafe building or structure.

104.12.5 Emergency demolition or securing. In the event an emergency should occur wherein the continued use or existence of a building, structure or utility may constitute an immediate hazard to life, health, property or public welfare, the Fire Code Official may order and/or cause the building, structure or utility to be demolished, removed, disconnected, secured or barricaded at once by any means available to the Fire Code Official. When feasible, the Fire Code Official shall attempt to give notice, by any means, to the owner of the building, structure or utility prior to taking any action. Cost and expense of demolition, removal, securing or barricading, if borne by the City, shall be recovered as provided for in this Section.

SECTION 105 PERMITS

Section 105.1 General is replaced:

105.1 General. The Fire Code Official shall be authorized to establish and issue permits, certificates, notices, approvals, or orders pertaining to fire and hazard control and fire and explosion hazards wherever indicated by this Code. A permit issued under the provisions of this Code shall continue until revoked or for such a period of time designated therein at the time of issuance. Such permit shall not be transferable, and any change in use, occupancy, operation, or ownership shall require a new permit. Permits for activities requiring evidence of financial responsibility by the jurisdiction shall not be issued unless proof of required financial responsibility is furnished. Any attempt to misrepresent or otherwise deliberately or knowingly design; install; service; maintain; operate; sell; represent for sale; falsify records, reports, or applications; or act in any related activity in violation of the requirements prescribed by this Code shall be a violation of this Code. Such violations shall be cause for immediate suspension or revocation of any related licenses, certificates, or permits issued by the Fire Code Official. In addition, any such violation shall be subject to any other criminal or civil penalties as available by the laws of this jurisdiction. An inspection is required prior to the issuance of a permit. Any person who engages in any business, operation, or occupation, or uses any premises, after the permit issued therefore has been suspended or revoked pursuant to the provisions of this Code, and before such suspended permit has been reinstated or a new permit has been issued, shall be in violation of this Code.

Section 105.1.4 other required permits is added as follows:

105.1.4 Other required permits. The requirements for permits from other City agencies shall not waive the requirement for permits required by this Code. Where a permit is required by other City agencies, such permit shall be obtained prior to or simultaneous with the issuance of a permit required by this Code.

Section 105.6 Required operational permits is added:

105.6 Required permits. The Fire Code official is authorized to issue permits for the operations set forth in Sections 105.6.1 through 105.6.160.

105.6.1 Abandoned buildings. A permit is required for abandoned and/or vacant buildings. (See IFC Section 311.)

- 105.6.2 Aerosol products.** A permit is required to manufacture, store or handle an aggregate quantity of Level 1, Level 2 or Level 3 aerosol products of 300 pounds (136 kg) or more net weight.
- 105.6.3 Air compressor.** A permit is required for building smoke management and fire protection systems certificate of fitness in accordance with ASME Code.
- 105.6.4 Aircraft hangar.** A permit is required per bay or square footage per NFPA 409.
- 105.6.5 Aircraft refueling vehicles.** A permit is required for each aircraft-refueling vehicle.
- 105.6.6 Ammunition.** A permit is required to store and handle ammunition, large arms and small arms.
- 105.6.6.1 Large arms**
- 105.6.6.2 Small arms**
- 105.6.7 Amusement buildings.** A permit is required to operate a special amusement building.
- 105.6.8 Appliances fueled by waste petroleum products.** A permit is required to operate appliances fueled by waste petroleum products.
- 105.6.9 Asbestos removal.** A permit is required for the removal of asbestos (for each building or portion thereof).
- 105.6.10 Asphalt kettles (other than roofing operations).** A permit is required to transport and operate an asphalt kettle.
- 105.6.11 Asphalt recycling.** A permit is required for all forms of asphalt recycling.
- 105.6.12 Automobile wrecking yard.** A permit is required for the operation of an automobile wrecking yard.
- 105.6.13 Aviation facilities.** A permit is required to use a Group H or Group S occupancy for aircraft servicing or repair and aircraft fuel servicing vehicles. Additional permits required by other sections of this code include, but are not limited to, hot work, hazardous materials, and flammable or combustible products.
- 105.6.14 Battery charging.** A permit is required to charge batteries on or off powered-industrial trucks and similar equipment having an electrolyte capacity of 10 gallons or more.
- 105.6.14.1 Battery charging – indoor.** A permit is required for indoor charging of batteries having an electrolyte capacity of 10 gallons or more.
- 105.6.15 Battery systems.** A permit is required for stationary storage battery systems having an electrolyte capacity of 10 gallons or more.
- 105.6.16 Blank cartridges.** A permit is required prior to the purchase of blank pyrotechnic cartridges. No dealer shall sell blank cartridges except upon presentation of an authorized permit.
- 105.6.17 Bonfires / Rubbish fires.** A permit is required for bonfires and rubbish fires.
- 105.6.18 Bowling alley refinishing.** A permit is required to refinish bowling alleys.
- 105.6.19 Building emergency communication system.** A permit is required to test the emergency communication system.
- 105.6.20 Building fire alarm system.** A permit is required to test the fire alarm system.
- 105.6.21 Building fire protection system.** A permit is required to test the fire protection system.

105.6.22 Building fire standpipe system. A permit is required to test the fire standpipe system.

105.6.23 Building property manager certification. A permit is required to obtain training and certification for building property managers.

105.6.24 Burning in public places / Open burning. A permit is required for the kindling or maintaining of an open fire or a fire on any public street, alley, road, or other public or private ground. Instructions and stipulations of the permit shall be adhered to.

Exception: Recreational fires when a fire ban has not been instituted.

105.6.25 Candles and open flames in assembly areas. A permit is required to use open flames or candles in connection with assembly areas, dining areas of restaurants or drinking establishments.

105.6.26 Canopies. A permit is required to erect a canopy having an area as follows:

105.6.26.1 Canopies having an area of 300 square feet or more but less than 500 square feet.

105.6.26.2 Canopies having an areas of 500 square feet or more.

105.6.27 Carbon dioxide (CO₂).

105.6.27.1 Carbon dioxide (CO₂) systems used in beverage dispensing applications. A permit is required for the use of carbon dioxide (CO₂) systems with more than 100 pounds (45.4 kg) of carbon dioxide or any system using any amount of carbon dioxide (CO₂) below grade used in beverage dispensing applications.

105.6.27.2 Carbon dioxide (CO₂) gas enrichment systems using on-site supply tanks and/or cylinders in plant growing (husbandry) applications. A permit is required for carbon dioxide enrichment systems with more than 100 pounds (45.4 kg) of carbon dioxide or any system using any amount of carbon dioxide (CO₂) below grade used in plant growing (husbandry) applications.

105.6.27.3 Carbon dioxide (CO₂) gas enrichment systems using a natural gas burner in plant growing (husbandry) applications. A permit is required for natural gas burners that are utilized to generate carbon dioxide (CO₂) in plant growing (husbandry) applications.

105.6.28 Carbon monoxide alarms and carbon monoxide detectors. A permit is required for the installation, relocation or removal of carbon monoxide alarms and detectors required under provisions of Section 915.

105.6.29 Carnivals and fairs. A permit is required to conduct a carnival or fair. The event coordinator shall be responsible for obtaining a permit which can be issued for a single event or annually; vendors shall be responsible for individual permits for booths.

105.6.30 Cellular/wireless signal repeater sites. A permit is required to install and maintain cellular/wireless signal repeater sites.

105.6.31 Cellulose nitrate. A permit is required to store, handle, use, or display cellulose nitrate.

105.6.32 Cellulose nitrate film. A permit is required to store, handle, use, or display cellulose nitrate film.

105.6.33 Certification – Construction fire safety officer. Includes point-of-contact relative to permits.

105.6.34 Chili roaster. A permit is required to operate a chili roaster as follows:

105.6.34.1 LPG fuel permit

105.6.35 Combustible fibers. A permit is required for the storage and handling of combustible fibers in quantities of 100 cubic feet (2.8 m³) or more.

Exception: A permit is not required for agricultural storage.

105.6.36 Combustible material storage. A permit is required to store in any building or upon any premises 2,500 cubic feet (71 m³) or more gross volume of combustible empty packing cases, boxes, barrels or similar containers, rubber tires, rubber, cork or similar combustible material.

105.6.37 Commercial rubbish. A permit is required to operate a rubbish or recycling handling facility.

105.6.38 Compressed gases (not LPG). A permit is required for the storage, use or handling at normal temperature and pressure (NTP) of compressed and liquefied gases in quantities equal or greater than the amounts listed in Table 105.6.38.

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

**TABLE 105.6.38
PERMIT AMOUNTS FOR COMPRESSED AND LIQUIFIED GASES ^a**

Type of Gas	Gaseous (cubic feet at NTP)	Liquefied (lbs.)
Biohazard	Any Amount	Any Amount
Carcinogen	200	37
Corrosive	200	37
Flammable	200	37
Highly Toxic	Any Amount	Any Amount
Inert	6,000	1,100
Irritant	200	37
Other Health Hazard	650	120
Oxidizing (including oxygen)	504	50
Pyrophoric	Any Amount	Any Amount
Sensitizer	200	37
Simple Asphyxiant	6,000	1,100
Toxic	Any Amount	Any Amount
Unstable (Reactive)	Any Amount	Any Amount

	Not Sealed (microcurie)	Sealed (millicurie)
Radioactive	Any Amount	Any Amount

For SI: 1 cubic foot = 0.02832m³

a. See Table 105.6.42 for cryogenic fluids, and Section 105.6.87 and Chapter 61 for liquefied petroleum gases (LPG)

105.6.39 Compressed natural gas (CNG). A permit is required to operate a compressed natural gas tank.

105.6.40 Conveyances. Annual operating permits are required for all conveyances regulated in accordance with ASME A17.1. See Section 919.

Exception: dumbwaiters and material lifts.

105.6.41 Covered mall buildings. A permit is required for:

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

105.6.42 Cryogenic fluids. A permit is required to produce, store, transport on site, use, handle or dispense cryogenic fluids in quantities equal to or greater than the amounts listed in Table 105.6. 42.

**TABLE 105.6.42
PERMIT AMOUNTS FOR CRYOGENIC FLUIDS**

Type of Cryogenic Fluid	Inside Building (gallons)	Outside Building (gallons)
Flammable	More than 1	60
Inert	60	500
Oxidizing (includes oxygen)	10	50
Physical or health hazard not indicated above	Any Amount	Any Amount

105.6.43 Demolition by explosives. A permit is required for the use of any explosive device for demolition operations.

105.6.44 Distilleries. A permit is required for an alcohol beverage production facility (ABPF) to produce, bottle, rectify, or process a beverage spirit with an alcohol-by-volume (ABV) content greater than 16 percent including areas for fermentation, distillation, bulk storage, blending, packaging, and accessory uses.

105.6.45 Dry cleaning plants. A permit is required to engage in the business of dry cleaning or to change to a more hazardous cleaning solvent used in existing dry cleaning equipment.

105.6.46 Dust-producing operations. A permit is required for all dust-producing operations. This permit does not include woodworking.

105.6.47 Emergency responder radio enhancement coverage system (RES). A permit is required for the annual and five-year testing of the system.

105.6.47.1 RES repair and maintenance. A permit is required for repair and maintenance of the emergency responder radio enhancement coverage system (RES).

105.6.48 Equipment testing. A permit is required to test equipment as follows:

105.6.48.1 Fire alarm systems. Smoke detector, horn/strobe, etc. Annual permit does not include overtime costs.

105.6.48.2 Fire protection systems. Sprinkler head, flow switch, etc. Annual permit does not include overtime costs.

105.6.48.3 Smoke management systems. Annual permit does not include overtime costs.

105.6.48.4 Standpipe systems. Annual permit does not include overtime costs.

105.6.49 Exhibits and trade shows. A permit is required to operate exhibits and trade shows.

105.6.50 Explosives/blasting agents. A permit is required for the manufacture, storage, handling, sale or use of any quantity of explosives, explosive materials, fireworks or pyrotechnic special effects within the scope of Chapter 56.

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

105.6.51 Failure to obtain a permit. A temporary permit is required when a required permit has not been obtained. The fee for this temporary permit shall be double the cost of the required permit.

105.6.52 File search. A fee may be required for the following file searches:

105.6.52.1 Fire Prevention/Hazardous materials

105.6.52.2 Amendment packet

105.6.52.3 Fire investigation records including videotapes

105.6.52.4 Property records

105.6.52.5 Inspection and permit records

105.6.53 Fire alarm signal delay equipment. A permit is required to install and maintain fire alarm signal delay equipment integrated with the FACP.

105.6.54 Fire department fire alarm radio transmitter (wireless Denver Fire Department communicator). A permit is required to install and maintain fire department fire alarm radio equipment for monitoring fire and burglar alarms.

105.6.55 Fire hydrants and valves. A permit is required to maintain a private fire hydrant system. This applies to existing systems only. New private fire hydrant systems are prohibited.

105.6.56 Fire protection system maintenance. A permit is required to perform maintenance on a private fire hydrant system.

105.6.57 Fire pumps and related equipment. A permit is required to inspect and test fire pumps and related equipment.

105.6.58 Fire watch. A permit is required whenever a fire watch is mandated.

105.6.59 Fireworks/pyrotechnics. A permit is required for all professional pyrotechnic programs.

105.6.60 Flammable or combustible liquids. A permit is required:

1. To use or operate a pipeline for the transportation within facilities of flammable or combustible liquids. This requirement shall not apply to the off-site transportation in pipelines regulated by the Department of Transportation (DOT) nor does it apply to piping systems.
2. To store, handle or use Class I liquids of 30 gallons (114 L) or more in a building or of 60 gallons (228.6 L) or more outside of a building, except that a permit is not required for the following:
 - 2.1. The storage or use of Class I liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant or mobile heating plant, unless such storage, in the opinion of the code official, would cause an unsafe condition.
 - 2.2. The storage or use of paints, oils, varnishes or similar flammable mixtures when such liquids are stored for maintenance, painting or similar purposes for a period of not more than 30 days.

3. To store, handle or use Class II or IIIA liquids of 60 gallons (228.6 L) or more in a building or of 120 gallons (457.1 L) or more outside a building, except for fuel oil used in connection with oil-burning equipment.
 - 3.1 To store, handle or use Class IIIB liquids of 1,000 gallons or more in a building or outside a building.
4. To remove Class I or Class II liquids from an underground storage tank used for fueling motor vehicles by any means other than the approved, stationary on-site pumps normally used for dispensing purposes.
5. To operate tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where flammable and combustible liquids are produced, processed, transported, stored, dispensed or used.
6. To place temporarily out of service (for more than 90 days) an underground, protected aboveground or aboveground flammable or combustible liquid tank.
7. To change the type of contents stored in a flammable or combustible liquid tank to a material that poses a greater hazard than that for which the tank was designed and constructed.
8. To manufacture, process, blend or refine flammable or combustible liquids.
9. To engage in the dispensing of liquid fuels into the fuel tanks of motor vehicles at commercial, industrial, governmental or manufacturing establishments.
10. To utilize a site for the dispensing of liquid fuels from tank vehicles into the fuel tanks of motor vehicles at commercial, industrial, governmental or manufacturing establishments.
11. A site plan shall be submitted showing the following: distances from all buildings, property lines, utility poles, power lines, railroad tracks, etc. A Hazardous Materials Inventory Statement (HMIS) may be required upon request.

105.6.61 Floor cleaning. A permit is required for floor cleaning operations using flammable or combustible liquids or compressed gases as follows:

105.6.61.1 Single address / one time

105.6.61.2 Annual / same building

105.6.61.3 Annual / multiple sites

105.6.62 Floor finishing. A permit is required for floor finishing, surfacing operations of 350 square feet (33 m²), or more using flammable or combustible liquids, or compressed gases.

105.6.63 Fruit and crop ripening. A permit is required to operate a fruit- or crop-ripening facility or conduct a fruit-ripening process using ethylene gas.

105.6.64 Fuel-fired equipment used in confined spaces. A permit is required to operate fuel-fired equipment in confined spaces.

105.6.65 Fumigation/thermal insecticidal fogging. A permit is required to operate a business of fumigation or thermal insecticidal fogging and to maintain a room, vault or chamber in which a toxic or flammable fumigant is used.

105.6.66 Generator Set. A permit is required to maintain and operate the following fueled generator set(s) with or without an integral tank.

105.6.66.1 Fuel Oil

105.6.66.2 Natural Gas

105.6.67 Halogenated agent systems/extinguishers. A permit is required to install and maintain a halogenated extinguishing agent system or portable fire extinguishers.

105.6.68 Halogenated hydrocarbons. A permit is required for the storage or use of halogenated hydrocarbons.

105.6.69 Hazardous materials. A permit is required to store, transport on site, dispense, use or handle hazardous materials in quantities equal or greater than the amounts listed in Table 105.6.69.

**TABLE 105.6.69
PERMIT AMOUNTS FOR HAZARDOUS MATERIALS**

TYPE OF MATERIAL	AMOUNT
Carcinogens	
Liquids	1 gallon
Solids	10 pounds
Combustible liquids	See Section 105.6.60
Corrosive materials	
Gases	See Section 105.6.38
Liquids	55 gallons
Solids	550 pounds
Explosive materials	Any Amount
Flammable materials	
Gases	See Section 105.6.38
Liquids	See Section 105.6.60
Solids	100 pounds
Cryogenics	See Section 105.6.42
Highly toxic materials	
Gases	See Section 105.6.38
Liquids	Any Amount
Solids	Any Amount
Irritants	
Liquids	55 gallons
Solids	550 pounds
Other Health Hazards	
Liquids	55 gallons
Solids	550 pounds
Oxidizing materials	
Gases	See Section 105.6.38
Liquids	
Class 4	Any Amount
Class 3	10 pounds ^a
Class 2	100 pounds
Class 1	550 pounds
Solids	
Class 4	Any Amount
Class 3	10 pounds ^a
Class 2	100 pounds
Class 1	550 pounds
Cryogenics	See Section 105.6.41

TYPE OF MATERIAL	AMOUNT
Organic peroxides	
Liquids	
Class I	Any Amount
Class II	Any Amount
Class III	10 pounds
Class IV	20 pounds
Class V	No Permit Required
Solids	
Class I	Any Amount
Class II	Any Amount
Class III	10 pounds
Class IV	20 pounds
Class V	No Permit Required
Pyrophoric materials	
Gases	See Section 105.6.38
Liquids	Any Amount
Solids	Any Amount
Radioactive materials	
Not sealed	1 microcurie
Sealed	1 millicurie
Sensitizers	
Liquids	55 gallons
Solids	550 pounds
Toxic materials	
Gases	See Section 105.6.38
Liquids	Any Amount
Solids	Any Amount
Unstable (reactive) materials	
Liquids	
Class 4	Any Amount
Class 3	Any Amount
Class 2	10 pounds
Class 1	100 pounds
Solids	
Class 4	Any Amount
Class 3	Any Amount
Class 2	10 pounds
Class 1	100 pounds
Water-reactive materials	
Liquids	
Class 3	Any Amount
Class 2	50 pounds
Class 1	100 pounds
Solids	
Class 3	Any Amount
Class 2	50 pounds
Class 1	100 pounds
Biohazard	Any Amount

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

a. 200 pounds when Table 5003.1.1(1) Note k applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 200 pounds or less.

105.6.70 Hazardous materials inventory statement plan review. A permit is required for review and comment of any HMIS.

105.6.70.1 HMIS – with less than 10 entries.

105.6.70.2 HMIS – with 10 or more entries.

105.6.71 Hazardous production materials. A permit is required to store, handle or use hazardous production materials.

105.6.72 Hazardous waste generator. A permit is required for any operation that generates hazardous waste.

105.6.72.1 Contingency plan review. A review of contingency plans is required for any operation that generates any amount of hazardous waste.

105.6.73 Heliports and helistops. A permit is required for the operation of any heliport or helistop.

105.6.74 High-piled storage. A permit is required to use a building or portion thereof as a high-piled storage area of 500 square feet (46 m²) or more.

105.6.75 Holiday decorations in public assembly occupancies. A permit is required to use any holiday decorations – natural vegetation, crepe paper, etc. in any public assembly occupancy.

105.6.76 Hot work operations. A permit is required for hot work including, but not limited to:

1. Public exhibitions and demonstrations where hot work is conducted.
2. Use of portable hot work equipment inside a structure.
3. Fixed-site hot work equipment such as welding booths.
4. Hot work conducted within a hazardous fire area.
5. Application of roof coverings with the use of an open-flame device.
6. Cutting and welding.

105.6.77 Hypergolic materials. A permit is required to store or use any amount of hypergolic materials.

105.6.78 Industrial trucks. A permit is required for all industrial trucks in accordance with NFPA 505.

105.6.79 Inert gas systems used in commercial, manufacturing or industrial applications. A permit is required for the use of inert gas systems with more than 100 pounds (45.4 kg) of an inert gas or any system using any amount of an inert gas below grade used in a commercial, manufacturing or industrial application, such as water treatment with pH balancing, food processing or laboratories.

105.6.80 Insecticides/pesticides/fumigants. A permit is required to apply, sell and manufacture insecticides, pesticides or fumigants.

105.6.80.1 One location/one time

105.6.80.2 Annual/multiple locations

105.6.81 Interim permit. An interim permit may be issued allowing work under restrictions or conditions while awaiting submittal of installation documents.

105.6.82 Interior fire alarm system maintenance. A permit is required to maintain fire alarm equipment.

105.6.83 Laboratories. A permit is required to operate a laboratory that stores or uses hazardous materials or flammable substances.

105.6.84 Limited fueling and other fuel transport operations. A permit is required for each vehicle approved for limited fueling and fuel transport operations.

105.6.85 Liquefied chlorine. A permit is required to store, use, sell and transport liquefied chlorine.

105.6.86 Liquefied- or gas-fueled vehicles or equipment in assembly buildings. A permit is required to display, operate or demonstrate liquid- or gas-fueled vehicles or equipment in assembly buildings.

105.6.87 Liquefied Petroleum Gas (LPG). A permit is required for:

105.6.87.1 Operate/maintain any container or system

105.6.87.2 Limited operations/construction sites

105.6.87.3 Roofing operations

105.6.87.4 Operation of cargo tankers that transport LP gas

105.6.87.5 Operation of an automated cylinder exchange station

105.6.88 Lubricating oils. A permit is required to transport, store, sell or use 100 gallons or more of lubricating oils.

105.6.89 Lumber yards. A permit is required for the storage or processing of lumber of 100,000 board feet (8,333 ft.³) (236 m³) or more.

105.6.90 Magnesium. A permit is required to melt, cast, heat treat or grind 10 pounds (4.54 kg) or more of magnesium.

105.6.91 Marijuana operations.

105.6.91.1 Carbon dioxide (CO₂) enrichment process (use). A permit is required for a marijuana CO₂ enrichment process. See 105.6.27.2.

105.6.91.2 Compressed gas use and storage. A permit is required for the use and storage of compressed gas in a marijuana facility. See 105.6.38.

105.6.91.3 Extraction process. A permit is required for a marijuana extraction process.

105.6.91.4 Fumigation. A permit is required for fumigation in a marijuana facility. See 105.6.65.

105.6.91.5 Hazardous materials use and storage. A permit is required for the use and storage of hazardous materials in a marijuana facility.

105.6.91.6 Liquefied petroleum gas (LPG) – butane transfilling operations. A permit is required for LPG-butane transfilling operations in a marijuana facility.

105.6.91.7 Liquefied petroleum gas (LPG) use and storage. A permit is required for the use and storage of liquefied petroleum gas in a marijuana facility.

105.6.91.8 Medical marijuana center (dispensary). A permit is required for a medical marijuana center (dispensary).

105.6.91.9 Medical marijuana infused product (kitchen). A permit is required for a medical infused product kitchen.

105.6.91.10 Medical marijuana optional premise cultivation. A permit is required for medical marijuana optional premise cultivation

105.6.91.11 Pesticide inventory statement. A permit is required for a pesticide inventory statement for a marijuana facility.

105.6.91.12 Private cultivation. A permit is required for private marijuana cultivation.

105.6.91.13 Private extraction. A permit is required for private marijuana extraction operations.

105.6.91.14 Retail cultivation. A permit is required for retail marijuana cultivation.

105.6.91.15 Retail product manufacturing. A permit is required for retail marijuana product manufacturing.

105.6.91.16 Retail store. A permit is required for a retail marijuana store.

105.6.91.17 Retail testing facility. A permit is required for a retail marijuana testing facility.

105.6.92 Matches. A permit is required for bulk storage of matches.

105.6.93 Medical gas systems. A permit is required for each medical gas system.

105.6.94 Mobile food vending—fuels, generators, hood-extinguishing systems, etc. A permit is required for a mobile food vending operation.

105.6.94.1 Compressed gas.

105.6.94.2 Generators.

105.6.94.3 Hood extinguishing system.

105.6.95 Motor fuel dispensing facilities. A permit is required for operation of automotive and marine motor fuel-dispensing facilities. Fuel is calculated and assessed separately.

105.6.95.1 Flammable and combustible liquids

105.6.95.2 Compressed Natural Gas (CNG)

105.6.95.3 Liquefied Petroleum Gas (LPG)

105.6.95.4 Hydrogen

105.6.96 Motor fuel dispensing facilities – Fleet/private service. A permit is required for operation of fleet or private motor fuel dispensing facilities. Fuel calculated and assessed separately.

105.6.96.1 Flammable and combustible liquids

105.6.96.2 Compressed Natural Gas (CNG)

105.6.96.3 Liquefied Petroleum Gas (LPG)

105.6.96.4 Hydrogen

105.6.97 Motor fuel storage systems. A permit is required for certification to install, test, alter, repair or remove equipment.

105.6.98 Motorcycle vehicle repair shops. A permit is required to operate a motorcycle vehicle repair shop.

105.6.99 Nitrous oxide-piped systems. A permit is required to maintain a nitrous oxide-piped system.

105.6.100 Occupant load increase. A permit is required to increase the occupant load of an assembly occupancy. The maximum increase shall be 10% when egress, seating, etc. remain in compliance with this code. This permit shall be for one event only.

105.6.101 Open flame. A permit is required for any open flame equipment.

105.6.102 Open flames and torches. A permit is required to remove paint with a torch; or to use a torch or open-flame device in a hazardous fire area.

- 105.6.103 Open flame on aircraft servicing ramp.** An annual permit is required to use any open flame equipment on an aircraft fuel service ramp.
- 105.6.104 Organic coatings.** A permit is required for any organic-coating manufacturing operation producing one gallon (4L) or more of an organic coating in one day.
- 105.6.105 Ovens (industrial baking or drying).** A permit is required for operation of industrial ovens regulated by Chapter 30.
- 105.6.106 Ozone generator.** A permit is required to operate an ozone generator.
- 105.6.107 Pallet storage.** A permit is required for indoor or outdoor pallet storage of 2,000 square feet or more.
- 105.6.108 Parade floats.** A permit is required for any parade float ground or airborne.
- 105.6.109 Places of assembly.** A permit is required to operate a place of assembly.
- 105.6.109.1 Occupant load > 150 but < 300**
- 105.6.109.2 Occupant load 300 - 2500**
- 105.6.109.3 Occupant load > 2500**
- 105.6.110 Plan review.** A permit is required for plan review as outlined in the City of Englewood Fire Permit fee schedule.
- 105.6.111 Plant husbandry.** A permit is required for the operation of a plant husbandry facility.
- 105.6.112 Plastic foam products (flammable).** A permit is required to store and use over 1,000 lbs.
- 105.6.113 Powder coating (See Spray booth for powder coating).**
- 105.6.114 Pressure vessels.** A permit is required to use a pressure vessel.
- 105.6.115 Private fire hydrants. See Fire hydrants and valves.**
- 105.6.116 Pyrophoric materials.** A permit is required to store or use pyrophoric materials.
- 105.6.117 Pyrotechnic special effects material.** A permit is required for use and handling of pyrotechnic special effects material.
- 105.6.118 Pyrotechnic event.** A permit is required for all pyrotechnic events
- 105.6.118.1 After-hours inspection**
- 105.6.118.2 Use of fog machine**
- 105.6.118.3 Indoor/Outdoor pyrotechnic event**
- 105.6.118.4 Use of propane effects**
- 105.6.118.5 Pyrotechnic inspector during event.** (Paid by promoter as after-hours inspection)
- 105.6.119 Pyrotechnician.** A permit/certificate of fitness is required for all pyrotechnicians.
- 105.6.120 Pyroxylin plastics.** A permit is required for storage or handling of 25 pounds (11 kg) or more of cellulose nitrate (pyroxylin) plastics and for the assembly or manufacture of articles involving pyroxylin plastics.
- 105.6.121 Radioactive material.** A permit is required to store, use or handle radioactive material.
- 105.6.122 Recycling facilities.** A permit is required to operate a recycling facility.

105.6.123 Refrigeration equipment. A permit is required to operate a mechanical refrigeration unit or system regulated by Chapter 6.

105.6.124 Repair garages A permit is required for operation of major repair garages as defined in NFPA 30A.

105.6.125 Reviewing stands/grandstands. A permit is required to erect and use reviewing stands or grandstands.

105.6.126 Salvage yard. A permit is required to operate a salvage yard, not including other permits required by this code.

105.6.127 Special conditional permit. A permit is required for special conditions, such as confined spaces, vacated areas, abandoned tanks, etc.

105.6.128 Special events. A permit is required for special events.

105.6.128.1 Places of assembly – any hazardous material or process at temporary events.

105.6.128.2 Places of assembly – refueling operations at temporary events in assembly occupancies.

105.6.128.3 Places of assembly – storage, use and handling of flammable/combustible liquids at temporary events.

105.6.128.4 Places of assembly – storage, use and handling of compressed gases at temporary events.

105.6.128.5 Event within existing facility

105.6.128.6 Plan submittal less than 14 days prior to event

105.6.128.7 Outdoor with six or more fuel-fired cooking/heating units

105.6.129 Special extinguishing system. A permit is required to maintain a special extinguishing system.

105.6.130 Special fire alarm system. A permit is required to maintain a special fire alarm system.

105.6.131 Special spray application projects. A permit is required for applying flammable or combustible finishes to the interior of a structure.

105.6.132 Spray booth for powder coating. A permit is required to use a spray booth for powder coating.

105.6.133 Spraying or dipping. A permit is required to conduct a spraying or dipping operation utilizing flammable or combustible liquids regulated by Chapter 57.

105.6.133.1 One time / one location

105.6.133.2 Annual / various locations

105.6.133.3 Booth or room

105.6.133.4 Limited spraying spaces

105.6.134 Spraying of water based finishes. A permit is required to conduct a spraying operation utilizing water-based liquids.

105.6.135 Storage containers.

105.6.135.1 Temporary – less than 180 days

105.6.135.2 Permanent – 180 days or longer

105.6.136 Storage of scrap tires and tire by-products. A permit is required to establish, conduct or maintain storage of scrap tires and tire byproducts of 2,500 cubic feet (71 m²) or more total volume of scrap tires and for indoor storage of tires and tire byproducts.

105.6.137 Stored electrical energy emergency/standby power systems. A permit is required to install or operate stored electrical energy emergency/standby power systems.

105.6.138 Sulphur/Sulphur chloride. A permit is required to store, sell or use Sulphur or Sulphur chloride.

105.6.139 Supervising station/central station. A permit is required to receive fire alarm signals from a protected property.

105.6.140 Tanks (Change of content). A permit is required to change the contents of a chemical or fuel storage tank.

105.6.141 Temporary fire standpipe. A permit is required to install and maintain a temporary fire standpipe.

105.6.142 Temporary generator. A permit is required to use a temporary generator.

105.6.143 Temporary heating appliance. A permit is required to install or use a temporary heating appliance.

105.6.143.1 Temporary space heating appliances (electric) in existing buildings – all permits must be obtained from designated fire official via building ownership or management.

105.6.144 Tents or temporary membrane structures. See Section 3103.2.

105.6.144.1 Tent or temporary membrane structure - not open on all sides and having an area in excess of 200 sq. ft.

105.6.144.2 Tent or temporary membrane structure - open on all sides and having an area of 400 sq. ft. or more.

105.6.145 Tire rebuilding/recapping plants. A permit is required for the operation and maintenance of a tire rebuilding or recapping plant.

105.6.146 Tire shredding. A permit is required for operations involving shredding of tires.

105.6.147 Tire storage. A permit is required for tire storage of 2500 cubic ft. or more in any one-control area.

105.6.148 Trailer. A permit is required for trailers used for office functions.

105.6.148.1 Temporary – less than 180 days

105.6.148.2 Permanent – 180 days or longer

105.6.149 Training fees. A permit is required for Denver Fire Department training.

105.6.149.1 High-rise building evacuation exercise

105.6.149.2 Low-rise building evacuation exercise

105.6.149.3 Building management/facility manager emergency procedures certification training (per person)

105.6.149.4 Fire extinguisher training (2 hours – does not include extinguisher; limited to 5 persons)

105.6.149.5 Floor warden training (limited to 5 persons)

105.6.149.6 Hazardous materials closure plan

105.6.149.7 Hazardous materials waste generation plan

105.6.149.8 Hazardous materials inventory statement training (2 hours; limited to 5 persons)

105.6.149.9 Hazardous materials management plan (2 hours; limited to 5 persons)

105.6.149.10 Hazardous materials release mitigation training (2 hours; limited to 10 persons)

105.6.149.11 Safety and evacuation training (2 hours; limited to 10 persons)

105.6.149.12 Fire safety public education presentation

- 105.6.150 **Underground hazardous material storage tanks.** A permit is required to maintain an underground hazardous material storage tank (per tank).
- 105.6.151 **Underground spaces.** A permit is required to inspect and certify underground spaces.
- 105.6.152 **Vacant properties.** A permit is required for vacant properties.
- 105.6.153 **Varnishes.** A permit is required to store or use varnish.
- 105.6.154 **Waste material handling plant.** A permit is required to operate waste material handling plants, wrecking yards, junk yards and waste material-handling facilities.
- 105.6.156 Waste receptacles.** A permit is required to install and maintain waste receptacles with a capacity greater than 20 cubic feet.
- 105.6.157 Waxes.** A permit is required to store, sell or use 400 lbs. of wax or more.
- 105.6.158 Wood products.** A permit is required to store 200 cubic ft. or more of wood products.
- 105.6.159 Wooden packing boxes, cases and barrels (empty).** A permit is required to store 2,000 cubic ft. or more.
- 105.6.160 Woodworking operations.** A permit is required to operate a woodworking operation that meets one of the following criteria:
1. has more than three (3) fixed or table-mounted wood sawdust-producing pieces of equipment, or
 2. has a floor area greater than 2,500 sq. ft., or
 3. Has a room or building considered being an explosion hazard based on dust accumulations exceeding 1/8" or a visible dust cloud.

Section 105.7 Required construction permits is replaced in its entirety with the following:

105.7 Required construction permits. The Fire Code Official is authorized to issue construction permits for work as set forth in Sections 105.7.1 through 105.7.32.

105.7.1 Appliances fueled by waste petroleum products. A construction permit is required to install appliances fueled by waste petroleum products.

105.7.2 Automatic fire extinguishing systems. A construction permit is required prior to the installation or modification of automatic fire extinguishing systems. Work performed to keep equipment operable or to make repairs is considered maintenance and, except as required for the following fire protection systems, when performed in accordance with this Code, is not considered a modification and does not require a permit:

- Alternative automatic fire extinguishing systems
- Automatic sprinkler systems

Exceptions:

1. A required permit may be acquired after work is performed on an emergency basis to maintain an existing fire extinguishing system. The penalties stated herein shall not apply if the emergency permit application is submitted within two (2) normal business days after commencement of the emergency work. A full permit application is required within ten (10) normal business days after commencement of the emergency work.

2. With written approval from the Fire Code Official prior to commencement of the work, maintenance performed in accordance with this code shall not require a permit.

105.7.3 Battery systems. A construction permit is required to install stationary storage battery systems having a liquid capacity of 50 gallons (189 L) or more.

105.7.4 Carbon dioxide (CO₂).

105.7.4.1 Carbon dioxide (CO₂) systems used in beverage dispensing applications. A construction permit is required for the installation of carbon dioxide (CO₂) systems with more than 100 pounds (45.4 kg) of carbon dioxide or any system using any amount of carbon dioxide (CO₂) below grade used in beverage dispensing applications.

105.7.4.2 Carbon dioxide (CO₂) gas enrichment systems using on-site supply tanks and/or cylinders in plant growing (husbandry) applications. A construction permit is required for the installation of carbon dioxide enrichment systems with more than 100 pounds (45.4 kg) of carbon dioxide or any system using any amount of carbon dioxide (CO₂) below grade used in plant growing (husbandry) applications.

105.7.4.3 Carbon dioxide (CO₂) gas enrichment systems using a natural gas burner in plant growing (husbandry) applications. A construction permit is required for the installation of natural gas burners that are utilized to generate carbon dioxide (CO₂) in plant growing (husbandry) applications.

105.7.5 Cellular / Wireless signal repeater site. A construction permit is required to install a cellular/wireless signal repeater site.

105.7.6 Compressed gases. When the compressed gases in use or storage exceed the amounts listed in Table 105.6.38, 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.

105.7.7 Compressed natural gas (CNG). A construction permit is required to install, modify or remove a compressed natural gas tank.

105.7.8 Conveyances. Construction permits are required for the installation, alteration, modification, removal, maintenance and testing of all elevators and conveyances within the City of Englewood. Shop and/or layout drawings shall be submitted for review and approval prior to issuance of permits. Drawings shall comply with ASME A17.1. Two sets of specifications and accurately scaled and fully dimensioned construction plans shall be provided in accordance with Appendix N. These plans shall include the applicable code edition which shall conform to the edition of the code currently adopted and shall include specifications of interior cab materials or indication on the plans that interior cab work is to be completed by

others. Permits issued shall be displayed in the conveyance control room or control space associated with the permitted conveyance.

105.7.9 Cryogenic fluids. A construction permit is required to install, repair damage to, abandon, remove, place temporarily out of service, close or substantially modify an outdoor stationary cryogenic fluid storage systems where the system capacity exceeds the amounts listed in Table 105.6.42. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

105.7.10 Fire alarm and detection systems and related equipment. A construction permit is required prior to the installation or modification of fire alarm and detection systems and related equipment. Work performed to keep equipment operable or to make repairs is considered maintenance and, when performed in accordance with this code is not considered modification and does not require a construction permit.

1. Construction permits are required for any work to the following systems.

Exceptions:

- Emergency alarm systems
- Emergency communication systems (ECS)
- Mass notification systems
- Public safety radio communication systems (RES)
- Two-way communication systems

2. A required permit may be acquired after work is performed on an emergency basis to maintain an existing fire alarm or detection system. The penalties stated herein shall not apply if the emergency permit application is submitted within two (2) normal business days after commencement of the emergency work. A full permit application is required within ten (10) normal business days after commencement of the emergency work.

3. With written approval from the fire code official prior to the work, maintenance performed in accordance with this code may not require a permit.

105.7.11 Fire pumps and related equipment. A construction permit is required prior to the installation or modification of fire pumps and related fuel tanks, jockey pumps and controllers. Work performed to keep equipment operable or to make repairs is considered maintenance and, when performed in accordance with this code, is not considered a modification and does not require a permit.

Exceptions:

1. A required permit may be acquired after work is performed on an emergency basis to maintain an existing fire pump. The penalties stated herein shall not apply if the emergency permit application is submitted within two (2) normal business days after commencement of the emergency work. A full permit application is required within ten (10) normal business days after commencement of the emergency work.

2. With written approval from the fire code official prior to the work, maintenance performed in accordance with this code shall not require a permit.

105.7.12 Flammable and combustible liquids. A construction permit is required:

1. To repair or modify a pipeline for the transportation of flammable or combustible liquids.
2. To install, construct or alter tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where

flammable and combustible liquids are produced, processed, transported, stored, dispensed or used.

3. To install, alter, remove, abandon or otherwise dispose of a flammable or combustible liquid tank.

105.7.13 Generator Set. A construction permit is required to install the following fueled generator set(s) with or without an integral tank.

105.7.13.1 Fuel Oil

105.7.13.2 Natural Gas

105.7.14 Hazardous materials. A construction permit is required to install, repair damage to, abandon, remove, place temporarily out of service, or close or substantially modify a storage facility or other area (including but not limited to tanks) regulated by Chapter 50 when the hazardous materials in use or storage exceed the amounts listed in Table 105.6.69.

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.

105.7.15 High-piled combustible storage. A construction permit is required for the installation or reconfiguration of all high-piled storage systems.

105.7.16 Industrial ovens. A construction permit is required for installation of industrial ovens covered by Chapter 30.

Exceptions:

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

105.7.17 Inert gas systems used in commercial, manufacturing or industrial applications. A construction permit is required for the use of inert gas systems with more than 100 pounds (45.4 kg) of an inert gas or any system using any amount of an inert gas below grade used in a commercial, manufacturing or industrial application, such as water treatment with pH balancing, food processing or laboratories.

105.7.18 LP-gas. A construction permit is required for installation of or modification to an LP-gas system.

105.7.18.1 Cage – an installation permit is required to install a cage for storage of portable LP gas containers awaiting use or resale.

105.7.18.2 Tank – a construction permit is required to install, repair damage to, abandon, remove or place temporarily out of service an LP gas tank.

105.7.18.3 Automated cylinder exchange station. – A construction permit is required to install an automated cylinder exchange station.

105.7.19 Nitrous oxide-piped systems. A construction permit is required to install nitrous oxide-piped systems.

105.7.20 Ozone generator. A construction permit is required to install an ozone generator.

105.7.21 Powder coating. A construction permit is required to install a spray booth for powder coating.

105.7.22 **Pressure vessel.** A construction permit is required to install a pressure vessel.

105.7.23 **Private fire hydrants.** A construction permit is required for the installation or modification of private fire hydrants.

105.7.24 **Process piping.** A construction permit is required to install, repair or modify piping systems and their component parts (piping, tubing, valves and fittings) that convey hazardous materials including flammable and combustible liquids.

105.7.25 **Refrigeration equipment.** A construction permit is required for a mechanical refrigeration unit or system regulated by Chapter 6.

105.7.26 **Repair /garages.** A construction permit is required to install a repair garage operation.

105.7.27 **Smoke control systems.** A construction permit is required for the installation, modification, or removal from service of a smoke control system. Work performed to keep equipment operable or to make repairs is considered maintenance and, when performed in accordance with this code and Fire Department policy, is not considered a modification and does not require a construction permit.

Exceptions:

1. A required permit may be acquired after work is performed on an emergency basis to maintain an existing smoke control system. The penalties stated herein shall not apply if the emergency permit application is submitted within two (2) normal business days after commencement of the emergency work. A full permit application is required within ten (10) normal business days after commencement of the emergency work.
2. With written approval from the fire code official prior to the work, maintenance performed in accordance with this code shall not require a permit.

105.7.28 **Spraying or dipping.** A construction permit is required to install or modify a spray room, dip tank or booth.

105.7.29 **Standpipe systems.** A construction permit is required for the installation, modification, or removal from service of a standpipe system. Work performed to keep equipment operable or to make repairs is considered maintenance and, when performed in accordance with this code and Fire Department policy, is not considered a modification and does not require a permit.

Exceptions:

1. A required permit may be acquired after work is performed on an emergency basis to maintain an existing standpipe system. The penalties stated herein shall not apply if the emergency permit application is submitted within two (2) normal business days after commencement of the emergency work. A full permit application is required within ten (10) normal business days after commencement of the emergency work.
2. With written approval from the fire code official prior to the work, maintenance performed in accordance with this code shall not require a permit.

105.7.30 Temporary membrane structures, tents and canopies. A construction permit is required to erect an air-supported temporary membrane structure or a tent having an area of 400 square feet (37 m2) or more.

Exceptions:

1. Tents used exclusively for recreational camping purposes.
2. Funeral tents and curtains or extensions attached thereto, when used for funeral services.
3. Fabric canopies and awnings open on all sides, which comply with all of the following:
 - a. Individual canopies shall have a maximum size of 700 square feet (65 m2).
 - b. The aggregate area of multiple canopies placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m2) total.
 - c. A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be maintained.

105.7.31 Underground hazardous materials storage tanks. A construction permit is required to install an underground hazardous materials storage tank.

105.7.32 Woodworking operations. A construction permit is required to install a woodworking operation.

SECTION 106 INSPECTIONS

Sections 106.2.3 Dangerous or hazardous conditions or material through 106.2.13 Townhomes, condominiums and apartments are added:

106.2.3 Dangerous or hazardous conditions or material. The Fire Code Official shall have the authority to order any person(s) to remove or remedy such dangerous or hazardous condition or material as set forth in this code. Any person(s) failing to comply with such order shall be in violation of this code.

106.2.4 Right of entry. The Fire Code Official shall be authorized to inspect any building or premises for dangerous or hazardous conditions or materials as set forth in this code. Before entering, the Fire Code Official shall obtain the consent of the occupant thereof or obtain a court warrant authorizing entry for the purpose of inspection except in those instances where an emergency exists.

106.2.5 Emergency. As used in Section 106.2.4, "emergency" means circumstances that the fire code official knows, or has reason to believe, exist and can constitute immediate danger to life and property.

106.2.6 Authorized personnel. Uniformed fire inspectors, fire investigators, and fire protection engineers shall be authorized to enter and inspect buildings, structures, vessels, vehicles, and premises as herein set forth.

106.2.6.1 Impersonation. Persons shall not use a badge, uniform, or other credentials to impersonate the fire code official.

106.2.7 Hazardous conditions. Where conditions exist and are deemed hazardous to life and property by the fire code official, the fire code official shall have the authority to summarily abate such hazardous conditions that are in violation of this code.

106.2.8 Plans and specification. The Fire Code Official shall have the authority to require plans and specifications to ensure compliance with applicable codes and standards. The plans and specifications shall bear the stamp of a design professional in accordance with Appendix N.

106.2.9 Inspection of construction and installation. The Fire Code Official shall be notified by the person performing the work when the installation is ready for a required inspection or for fire protection or other life safety systems acceptance tests. All installations shall be complete prior to requesting an inspection or test. All components of a life safety system shall be installed prior to testing—no exceptions.

106.2.9.1 Work in violation. When any construction or installation work is being performed in violation of the plans and specifications approved by the Fire Code Official, a written notice shall be issued to the responsible party to stop work on that portion of the work that is in violation. The notice shall state the nature of the violation, and no work shall be continued on that portion until the violation has been corrected.

106.2.10 Stop work or evacuation. The Fire Code Official shall have the authority to order an operation or use stopped and the immediate evacuation of any occupied building, area of a building, or other property when such building, area of a building, or other property has hazardous conditions that present imminent danger.

106.2.10.1 Non-complying work. Whenever any work is being done contrary to provisions of this code, the fire code official is hereby authorized to order such work stopped. Such work should immediately stop until authorized by the Fire Code Official to proceed.

106.2.11 Standby personnel. When, in the opinion of the Fire Code Official it is essential for public safety in a tent, canopy or membrane structure used as a place of assembly or any other use where people congregate, or any building, premises or property where people congregate, because of the number of persons, or the nature of the performance, exhibition, display, contest or activity, or when potentially hazardous conditions exist, or an occupant load varies due to large crowd movement from one building to another building or one area of a building to another area of the building, or there is a reduction in a life safety feature, or there is an impairment to a fire protection feature, the owner, agency or lessee shall employ qualified Fire Watch personnel.

106.2.11.1 Owner's responsibility. The owner, agent, or lessee shall employ qualified Fire Watch personnel or standby fire personnel in an adequate number determined by the Fire Code Official based on the potential hazard or reduction in a fire protection system or other life safety feature as described in Section 106.2.11, as required and approved, to be on duty. Such standby fire personnel or fire watch personnel shall be subject to the Fire Code Official's orders at all times and shall be identifiable and remain actively on duty during the times such places are open to the public, when such activity is being conducted, or in residential buildings, whenever occupied.

106.2.12 Records. The Fire Marshal's Office shall retain, for the life of the building or structure, a record of each inspection made showing the findings and disposition of each inspection made.

106.2.13 Townhouses, condominiums and apartments. Portable fire extinguishers shall be mounted on the exterior at each level stairway(s) or one (2A:10BC) within each residential unit. When mounted on the exterior, the property management/homeowner's association (HOA) shall be responsible for the care, maintenance and recharging, and use of the fire extinguisher, including inspection. The homeowner shall submit a report to the property management (HOA) on an annual basis. Portable fire extinguishers shall be located, inspected and maintained in accordance with NFPA 10. The smoke detector(s) within the

residential units shall be tested and maintained in accordance with NFPA 72. The carbon monoxide detectors shall be located, inspected, tested and maintained in accordance with NFPA 720. The homeowner shall submit a report to the property management/HOA on an annual basis of each test and battery replacement. The property management/HOA shall maintain a log of the inspection/test reports submitted to that office and City of Englewood fire inspection personnel will review that log prior to conducting the inspection. If this information is not available, an inspection shall be made to determine that this equipment is in compliance with this code.

Section 106.5 Fees is added:

106.5 Fees. The City of Englewood is authorized to adopt fee schedules necessary to cover administrative costs of inspections, licensing, record-keeping, etc., for all fire prevention programs under this Code.

Section 106.6 Special inspections is added:

106.6 Special inspections. The Fire Code Official is authorized to conduct special inspections, including fire safety inspections and systems acceptance testing, outside of normal business hours as deemed necessary to determine the extent of compliance with the provisions of this Code. Certified personnel shall perform the fire safety inspections and systems acceptance testing. The property owner, property manager, or contractor shall reimburse the City for special inspections outside of normal business hours shall be a minimum of three (3) hours Monday through Friday and a minimum of four (4) hours on weekends and holidays.

**SECTION 107
MAINTENANCE**

Section 107.7 Fire watch personnel, 107.7.1 Owner's responsibility and 107.7.2 Permit required are added:

107.7 Fire watch personnel. When in the opinion of the Fire Code Official it is essential for public or occupant safety, because of potentially hazardous conditions or a reduction in safety due to the occupant load, crowd movement, type of performance, display, exhibit, use, contest, activity; impairment to a fire protection or other life safety system; or any similar condition, the fire code official shall have the authority to require a fire watch in any building, premises or property.

107.7.1 Owner's responsibility. The owner, agent, or lessee shall employ qualified personnel to conduct fire watch in adequate numbers as determined by the Fire Code Official based on the potential hazard or reduction in safety described in Section 107.7. Fire watch personnel shall be subject to the Fire Code Official's orders at all times and shall be identifiable and remain actively on duty during the times specified by the Fire Code Official.

107.7.2 Permit required. Permits shall be required as set forth in Section 105.6.58.

**SECTION 108 BOARD
OF APPEALS**

Section 108.1 Board of appeals is replaced in its entirety with the following:

108.1 Board of appeals established. In order to hear and decide appeals of orders, decisions, or determinations made by the Fire Code Official relative to the application and interpretation of this Code, the City Manager can hear the appeal alone or appoint a board of appeals consisting of members who are qualified by experience and training to make decisions pertinent to hazards of fire, explosions, hazardous conditions, flammable and combustible liquids and gases, the

use, storage and production of hazardous materials, or fire protection and other life safety systems and features.

108.1.1 Application. Prior to any action by the City Manager, an application in writing shall be filed with the office of the Fire Marshal within thirty (30) days after receiving the order, decision, or determination made by the Fire Code Official.

SECTION 109 VIOLATIONS

Sections 109.2.2.1 Failure to comply through 109.2.2.4 Citation are added:

109.2.2.1 Failure to comply. It shall be unlawful to violate any provisions of this code, or to fail to carry out an order made pursuant to this code or violate any condition attached to a permit, approval, or certificate, or to erect, install, alter, repair or do work in violation of approved construction documents, or without the appropriate license, permit or directive of the fire official. Violations shall be punishable as prescribed in the Englewood Municipal Code. It shall be unlawful to fail to pay fees authorized pursuant to this code.

109.2.2.2 Time limits. Failure to comply with the time limits of an abatement notice or after a corrective order or notice of violation is issued by the Fire Code Official shall result in each day that such violation continues being regarded as a new and separate violation and a new and separate offense.

109.2.2.3 Not owner-occupied. If the building or other premises is not owner occupied, under lease or otherwise, and the order or notice of violation requires additions or changes in the building or premises that would immediately become real estate and be the property of the owner of the building or premises, such orders or notices shall be complied with by the owner.

109.2.2.4 Citation. The Fire Code Official is authorized to issue a citation to persons operating or maintaining an occupancy, premises, vessel, vehicle or other property subject to this code who allow a hazard to exist or fail to take immediate action to abate a hazard on such occupancy, premises, vessel, vehicle, or other property when ordered or notified to do so. A citation may be issued when work is performed without the appropriate license, permit or directive of the Fire Official, or in violation of approved construction documents.

Section 109.3 Violation penalties is replaced in its entirety with the following:

109.3 Violation penalties. See Section 109.2.2.1 Failure to comply.

SECTION 110 UNSAFE BUILDINGS

Section 110.1 General is replaced in its entirety with the following:

110.1 General. If during the inspection of a premises, a building or structure or any building system, in whole or in part, constitutes a clear and inimical threat to human life, safety or health, the fire code official shall issue such notice or orders to remove or remedy the conditions as shall be deemed necessary in accordance with this section and shall refer the building to the Building Department for any repairs, alterations, remodeling, removing or demolition required. It shall be unlawful to maintain an unsafe condition in any building.

Section 110.1.1 Unsafe conditions is replaced in its entirety with the following:

110.1.1 Unsafe conditions. Structures or existing equipment that are or hereafter become unsafe or deficient because of inadequate means of egress, failure to comply with an approved occupant load, or which constitute a fire hazard such as storage of explosives, excessive

amounts of combustible or flammable materials, vegetation deemed an exposure hazard, manufacture of controlled substances, unstable material, hazardous materials, fire safety system(s) inoperative, etc., or are otherwise dangerous to human life or to the public welfare, or which involve illegal or improper occupancy or inadequate maintenance, shall be deemed an unsafe condition. A vacant structure that is not secured against unauthorized entry shall be deemed unsafe. A structure, including residences, that constitutes a fire hazard and an exposure hazard in the event of fire or explosion shall be deemed unsafe. It shall be unlawful to maintain an unsafe condition or to fail to obey an order of the Fire Code Official to correct an unsafe condition. The Fire Code Official is authorized to take action to mitigate an unsafe condition, rendering the operation harmless to people or property. The property owner shall be responsible for all costs related to all actions.

Section 110.1.2.1 Unsafe heating or electrical equipment and structural hazards is added:

110.1.2.1 Unsafe heating or electrical equipment and structural hazards. When the Fire Code Official deems any chimney, smokestack, stove, oven, incinerator, furnace, or other heating device, electrical fixture, or any appurtenance thereto, or anything regulated under a nationally recognized standard in or upon any building, structure, or premises not specifically mentioned in this code, to be unsafe or defective so as to create a hazard, the fire code official is authorized to serve upon the owner or the person having control of the property a written notice to remove or repair or alter as necessary. The Fire Code Official is authorized to affix a condemnation tag prohibiting the use thereof, or until such repairs or alterations are made. It shall be unlawful to maintain unsafe heating or electrical equipment and structural hazards or to fail to obey an order of the Fire Code Official to correct unsafe heating or electrical equipment and structural hazards.

Section 110.1.2.2 Unsafe operations is added:

110.1.2.2 Unsafe operations. When the Fire Code Official deems any operation, interior or exterior, to be unsafe so as to create a hazard, the fire code official is authorized to serve upon the owner, contractor, or the person having control of the property, a written notice to remove or repair or alter as necessary. The fire code official is authorized to affix a condemnation tag prohibiting the use thereof, or until such repairs or alterations are made. In the event that the unsafe operation resulted in an emergency response, legal action and cost recovery will be directed to the responsible party. It shall be unlawful to maintain unsafe operations or to fail to obey an order of the fire code official to correct unsafe operations.

Section 114 Licenses is added:

**SECTION 114
LICENSES**

114.1 General. A license is authority granted to the person to whom it is issued to perform the work in the City of Englewood authorized by the license.

114.2 Licenses required. City of Englewood licenses shall be required for the design, installation, modification, inspection, and testing of all life safety and conveyance systems and equipment. All life safety fitters/technicians shall be licensed to design, install, add to, modify, and perform all types of inspections, testing, maintenance, and repair of factory-engineered equipment. All persons required to have a permit, license or certificates shall have a current—for calendar year—permit, license or certificate.

114.2.1 Ammonia safety / alarm systems.

114.2.2 Backflow prevention for fire sprinkler systems

114.2.3 Carbon dioxide extinguishing systems.

- 114.2.4 Carbon monoxide detection systems.
- 114.2.5 Carbon monoxide safety / alarm warning systems.
- 114.2.6 Central station operator.
- 114.2.7 Central station runner.
- 114.2.8 Conveyances.
- 114.2.9 Clean agent fire extinguishing systems.
- 114.2.10 Radio enhancement systems.
- 114.2.11 Dry chemical extinguishing systems.
- 114.2.12 Electrical signaling and central wiring.
- 114.2.13 Emergency communication systems.
- 114.2.14 Fire alarm systems.
- 114.2.15 Fire detection systems.
- 114.2.16 Fire doors and other opening protectives.
- 114.2.17 Foam extinguishing systems.
- 114.2.18 Fire pumps.
- 114.2.20 Fire sprinkler systems – NFPA 13.
- 114.2.21 Fire sprinkler systems – NFPA 13D.
- 114.2.22 Fire sprinkler systems – NFPA 13R.
- 114.2.23 Fire standpipe systems – NFPA 14.
- 114.2.24 Firefighter's emergency elevator recall systems.
- 114.2.25 Foam extinguishing systems.
- 114.2.26 Kitchen hood extinguishing systems.
- 114.2.27 Oxygen coordinator.
- 114.2.28 Oxygen supply and delivery.
- 114.2.29 Portable fire extinguishers.
- 114.2.30 Refrigerant safety / alarm systems.
- 114.2.31 Rubbish and linen handling systems.
- 114.2.32 Smoke control systems.
- 114.2.33 Special extinguishing systems.

Section 115 Public Fire Education is added:

**SECTION 115
PUBLIC FIRE EDUCATION**

115.1 General. The Fire Code Official shall have the authority to develop and implement a public fire safety education program as deemed necessary for the general welfare with respect to the fire hazards within the jurisdiction.

115.2 Educational programs and messages. The Fire Code Official shall have the authority to ensure that duly authorized public fire safety educational programs or public fire safety messages are disseminated to the general public.

115.2.1 Juvenile firesetters intervention program. Juveniles suspected of fire setting—curious or malicious—shall be required to participate in the Denver Fire Department Juvenile Firesetters Intervention Program.

Section 116 Emergency Plans and Procedures is added:

SECTION 116

EMERGENCY PLANS AND PROCEDURES

116.1 General. Where required, emergency plans, staff training, and emergency evacuation drills are required for all occupants.

116.2. Plan requirements. Emergency plans and emergency evacuation drills shall be developed in accordance with the NFPA 1600, Standard on Disaster/Emergency Management and Business Community Programs, and Chapter 4, Emergency Planning and Preparedness, of this code.

116.3 Review. Emergency plans shall be submitted annually to the Fire Code Official for review.

116.4 Maintenance. Emergency plans shall be reviewed and updated annually. Revised plans shall be submitted for review and updates shall be provided whenever changes are made in the occupancy or physical arrangement of the building or fire protection systems or features. The owner or manager shall provide floor plans to the Fire Code Official.

Section 117 Fire Alarm Monitoring – Permits and Licenses is added:

SECTION 117

FIRE ALARM MONITORING - PERMITS AND LICENSES

117.1 General. The provisions of this section apply to the installation, operation of, and scope of monitoring.

117.2 Central alarm station / Supervising station. These facilities, licensed by the Denver Fire Department, monitor remote fire alarm signaling systems when personnel licensed by the Denver Fire Department are in attendance at all times to take such action as required for the notification of the Denver Fire Department.

117.3 Permits. Permits shall be obtained annually for central alarm station / supervising stations and the operators who take such action as required for notification of the Denver Fire Department. All central alarm station / supervising stations and operators shall have current—for current calendar year—permits and licenses.

117.4 Definitions. The following terms are defined in Chapter 2:

CENTRAL ALARM STATION/SUPERVISING STATION
CLASS I FIRE ALARM MONITORING
CLASS II FIRE ALARM MONITORING
OPERATOR
RUNNER

117.5 License required.

117.5.1 Central alarm station/supervising station. No person or public agency shall monitor fire alarm systems in the City of Englewood without first obtaining a license to operate a Class I or Class II central alarm station/supervising station.

117.5.2 Operator. No person shall be employed as an operator in a central alarm station/supervising station that monitors fire alarm systems in the City of Englewood unless licensed.

117.5.2.1 Class I operator. A Class I Operator license shall authorize the holder to act as an operator in any central alarm station/supervising station.

117.5.2.2 Class II operator. A Class II Operator license shall authorize the holder to act as an operator in any Class II central alarm station/supervising station.

117.5.2.3 Apprentice operator. An Apprentice Operator license shall authorize the holder to act as an operator only under the constant supervision of a licensed operator.

117.5.3 Runner. A central alarm station/supervising station Runner license shall authorize the holder to act as a runner for any Class I or Class II central alarm station/supervising station.

117.6 Runner service. The central alarm station/supervising station shall provide runner service to all Class I alarms. Maximum response time from receipt of alarm to arrival of runner service shall not exceed 45 minutes.

CHAPTER 2

DEFINITIONS

SECTION 202 GENERAL DEFINITIONS

Section 202 General Definitions is amended by the addition of the following terms:

ALARM CONTROL UNIT. A component of the [CO detection] system provided with a primary and secondary power source that receives signals from initiating devices or other control units, and processes these signals to determine the required system output functions.

ALCOHOL BEVERAGE (also, “ALCOHOL BEVERAGE”). A drinkable ethanol mixture intended for human consumption including wine, beer, and beverage spirits.

ALCOHOL BEVERAGE PRODUCTION FACILITY (ABPF). Any building or portion thereof where ethanol mixtures are produced, stored, handled, blended, dispensed, or bottled in the production of alcohol beverages including areas for grain storage and handling.

ALCOHOL BY VOLUME (ABV). Volume percentage of ethanol in an ethanol mixture.

ALTITUDE. Altitude is the measure of elevation typically relative to sea level. The generally recognized altitude of Denver, CO is 5,280 ft. Altitude has a direct impact on design considerations for life safety and property protection including but not limited to the physical properties of flammable and combustible liquids. See Section 3401.5.1.

APPLIANCE. Visible notification component such as a bell, horn, speaker, light, or text that provides audible, visible, and/or tactile outputs to alert occupants of a hazardous condition. Single-station alarms contain both a [initiating] device and a [notification] appliance.

BATTERY BACKUP. The listed device has a battery that powers it when the power provided through the building electrical system fails.

BATTERY-POWERED. The listed device is powered solely by a primary battery for all power requirements and the battery is monitored for end-of-life by producing an audible trouble signal.

BEVERAGE SPIRIT (TTB). A drinkable spirit intended for human consumption including neutral spirits or alcohol (i.e., vodka or grain spirits), whiskey, gin, brandy, blended applejack, rum, Tequila, cordials and liqueurs.

BIOHAZARD. An infectious agent or hazardous biological material that presents a risk or potential risk to the health of humans, animals or the environment. The risk can be direct through infection or indirect through damage to the environment. Biohazardous materials include certain types of recombinant DNA; organisms and viruses infectious to humans, animals or plants (e.g., parasites, viruses, bacteria, fungi, prions, rickettsia); and biologically active agents (i.e., toxins, allergens, venoms) that may cause disease in other living organisms or cause significant impact or the environment or community.

BREWERY. An ABPF or portion thereof, including accessory uses, in which beer or other malt liquors are produced. For spirit production, beer and wash are synonymous as precursors to distillation

BULK STORAGE. The storage of ethanol mixtures in containers exceeding 1.3 gallons (5L) in volume.

CARCINOGEN. A substance that causes the development of cancerous growths in living tissue. A chemical is considered to be a carcinogen if:

1. It has been evaluated by the International Agency for Research on Cancer (IARC) and found to be a carcinogen or potential carcinogen, or

2. It is listed as a carcinogen or potential carcinogen in the latest edition of the Annual Report on Carcinogens published by the National Toxicology Program, or
3. It is regulated by OSHA as a carcinogen.

CASK. A closed vessel of 185 gallons (700 L) or less capacity, used primarily for storing Class I liquids, constructed of wooden staves and heads, held together by metal hoops, not equipped with provisions for emergency venting, and not intended for fixed installation.

CENTRAL ALARM STATION/SUPERVISING STATION. A facility that receives fire alarm signals and at which personnel are in attendance at all times to respond to these signals. A supervising station that is licensed for central station service.

CENTRAL FUEL-BURNING APPLIANCE ROOM. A room containing a fuel burning appliance serving multiple dwelling units, such as a boiler, fire place, stove, furnace, or similar equipment, with the potential to distribute CO to multiple dwelling units.

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

CITY OF ENGLEWOOD FIRE CODE. The *International Fire Code* (IFC) published by the ICC as adopted and amended by the City of Englewood.

CLASS I LIQUIDS. Used in Chapter 38 to identify ethanol mixtures that are Class IB or Class IC flammable liquids.

CLASS I FIRE ALARM MONITORING. The monitoring of a fire alarm system by a licensed central station that is required by Building and Fire Codes.

CLASS II FIRE ALARM MONITORING. The monitoring of a fire alarm system by a licensed central station that is not required by Building and Fire Codes.

CO (CARBON MONOXIDE). A colorless odorless gas that is produced as a result of incomplete burning of carbon-containing fuels.

CO ALARM. A single- or multiple-station device having a sensor that responds to CO and listed in accordance with UL 2034 that provides audible notification. Required CO alarms may be monitored by an alarm control unit, but shall be powered independently and shall function autonomously in the event the alarm control unit is nonfunctional.

CO DETECTOR. A device listed per UL 2075 having a sensor that responds to CO, is monitored and powered by an alarm control unit, and does not necessarily have an integral notification appliance.

CONTAINER. Any closed vessel of 119 gallons (450 L) or less capacity used for transporting or storing Class I liquids, not intended for fixed installation and not constructed of wood, but possible equipped with an overpressure-relieving mechanism in accordance with FM Global Approved Standard for Plastic Plugs for Steel Drums, Class Number 6083, or equivalent.

DENVER BUILDING CODE. The collection of International Code Council (ICC) publications as adopted and amended by the City and County of Denver excluding the International Fire Code (IFC).

DENVER BUILDING AND FIRE CODE. The complete collection of International Code Council (ICC) publications as adopted and amended by the City and County of Denver.

DENVER FIRE CODE. The *International Fire Code* (IFC) published by the ICC as adopted and amended by the City and County of Denver.

DEVICE. An alarm-initiating component that originates transmission of a change-of-state condition, such as a CO detector, manual fire alarm box, etc. Single-station alarms are both a [initiating] device and a [notification] appliance.

DISTILLATION. The separation and concentration of the constituents of an ethanol mixture by slowly raising the temperature of the mixture through the boiling points of its constituents then collecting and condensing the constituent vapors separately from the mixture.

DISTILLERY (also DISTILLED SPIRITS PLANT – BEVERAGE). An ABPF licensed by the TTB to produce, bottle, rectify, process or store beverage spirits including areas for fermentation, distillation, storage, blending, packaging, and accessory uses. Other types of distilleries licensed by the TTB include:

DISTILLED SPIRITS PLANT – EXPERIMENTAL. An experimental distilled spirits plant established for specific and limited periods of time solely for experimentation in, or development of, industrial spirits or sources of materials used to produce spirits, or processes for producing or refining spirits.

DISTILLED SPIRITS PLANT – INDUSTRIAL. A distilled spirits plant established to manufacture articles, or produce, bottle or package, denature or warehouse spirits for industrial use. These spirits are not intended for beverage use. Distilled spirits – Vinegar Plants also fall into this category.

DISTILLED SPIRITS PLANT – INDUSTRIAL / BEVERAGE. A distilled spirits plant that manufactures beverage and industrial spirits on the same premises.

DUPLEX. A building consisting solely of a two-family dwelling as defined by the *International Residential Code*.

ELECTROLYTE. A solid, liquid, or aqueous salt solution that permits ionic conduction between positive and negative electrodes of a cell.

EMERGENCY shall mean one or more of the following:

- Fire, regardless of size or type
- Explosion
- Building, structure, or utility failure
- Rescue operations involving humans or animals, including people trapped in elevators due to power failure or mechanical malfunctions
- Failure of or damage to fire protection or life safety systems
- Exposure to a hazard(s)
- Panic
- Hazardous material leak or spill
- Overcrowding of any building or premises
- Rescue operations involving humans or animals injured or trapped in buildings, trenches, scaffolding, grandstands, etc.
- Any other hazard or situation involving or endangering life or property.

EMERGENCY RESPONDER RADIO ENHANCEMENT COMMUNICATION SYSTEM (RES/BDA). The RES/BDA is a network of amplifiers, fiber optic cable, coaxial cable, and radiating cable and/or discrete antennas with or without a distributed antenna system (DAS) controller, or an equivalent technology installed on or inside the property to enhance indoor public safety radio communications.

ETHANOL (also ETHYL ALCOHOL or GRAIN ALCOHOL). A volatile, flammable, colorless, neurotoxic liquid fit for human consumption with structural formula $\text{CH}_3\text{CH}_2\text{OH}$ (abbreviated as $\text{C}_2\text{H}_5\text{OH}$ or $\text{C}_2\text{H}_6\text{O}$).

ETHANOL MIXTURE. Liquid mixture comprised of ethanol and materials with hazards not regulated by the Building and Fire Code, namely water.

EXTRACTION. The process of using solvents to remove essential oils or other botanic material from the marijuana plant.

FALSE FIRE ALARM. The activation of any fire alarm system resulting in a response by the Fire Department, caused by the negligent or intentional misuse of the fire alarm system by an owner, employee, agent, tenant, guest, visitor, or any other activation of a fire alarm system not caused by a valid alarm signal, exclusive of a nuisance fire alarm.

FERMENTATION. An enzymatically controlled, anaerobic breakdown of energy-rich compounds such as simple carbohydrates by microorganisms such as yeast, to yield carbon dioxide and ethanol.

FUEL-BURNING APPLIANCE. An appliance that burns carbon-containing solid, liquid, and/or gaseous fuels.

HARDWIRED. Device installed by wiring directly to the building electrical system, with battery backup, and not controlled by any disconnecting switch other than as required for over-current protection.

HAZ MAT (HAZARDOUS MATERIALS). Materials with hazards regulated by the Building and Fire Code.

HAZMAT INVENTORY STATEMENT (HMIS). A portion of an HMR containing a list of all the HazMat in a facility including information related to the materials such as product names, locations, quantities, regulated hazards, and Chemical Abstract Service (**CAS**) numbers.

HAZMAT MANAGEMENT PLAN (HMMP). A portion of an HazMat Permit Application containing site maps and facility floor plans identifying HazMat locations and site and building features relevant to the management of HazMat inventories, systems and operations.

HAZMAT REPORT (HMR). A consolidated description of a facility and the HazMat therein including a contact list, code-based description of the building and adjacent outdoor areas, and a HazMat Inventory Statement (HMIS).

INSTALLED. Fit into position and made ready as set forth in the manufacturer's guidelines, listing requirements and applicable standards, to perform the intended functions of detection, notification, and annunciation.

INTERMEDIATE BULK CONTAINER. Any closed vessel defined in Title 49, *Code of Federal Regulations*, Parts 100 through 199 or in Part 6 of the United Nations' Recommendations on the Transport of Dangerous Goods having a liquid capacity of 793 gallons (3000 L) or less, used for transporting or storing Class 1 Liquids, not equipped with provisions for emergency venting, not intended for fixed installation, and not constructed of wood.

LOWER FLAMMABLE LIMIT (LFL) also [LOWER EXPLOSIVE LIMIT (LEL)]. The atmospheric volumetric concentration of a flammable vapor at which propagation of flame will occur in the presence of an ignition source. The LFL at sea level for ethanol vapor is 3.3 percent.

LOWEST LEVEL OF FIRE DEPARTMENT VEHICLE ACCESS. The lowest level of Fire Department vehicle access shall be measured from the lowest elevation of any required Fire Department access road located no more than 30 feet from any exterior wall of the building.

Exceptions:

1. Where the access road is permitted to be farther than 30 feet from any exterior wall of the building, the lowest level of fire department vehicle access shall be measured from the lowest elevation of any required Fire Department access road located no more than 50 feet from any exterior wall of the building.
2. If any topography, waterway, non-negotiable grades or other similar conditions exist that, preclude required Fire Department vehicular access, the fire code official is authorized to require additional fire protection systems as required by Chapter 9.

MACHINERY ROOM. See Section 1104.2 of the *International Mechanical Code*.

MASH. Typically, the mixture of ground or cracked grains, mashed fruit, or other crushed edible organic material steeped in hot water to release carbohydrates and reduce them to sugars. The term is used inconsistently (often overlapping with wort) for the various solutions in process up to the point where fermentation is complete.

MASS NOTIFICATION SYSTEM. A mass notification system (MNS) is a system used to provide emergency information and instructions to people in a building, area, site or other space using intelligible voice communications and possibly including visible signals, text, graphics, tactile, or other communications methods.

MINIMUM EXPLOSIVE CONCENTRATION (MEC). The lowest mass to volume concentration of combustible dust that will propagate a flame (sometimes referred to as LFL). The MEC for grain dust is 0.055 oz/ft³ (55 g/m³).

MULTIPLE PURPOSE ALARM. A single device that incorporates the capability to detect more than one hazard, such as smoke, vapors, and/or gases. Multiple purpose devices shall emit audible alarms in a manner that clearly differentiates between the detected hazards.

MULTIPLE STATION ALARM. [1] A single alarm device capable of being physically or wirelessly interconnected to one or more similarly capable devices so the actuation of any one device causes the appropriate notification signal to occur in all interconnected devices.
[2] An interconnected group of single-alarm devices defined in [1].

NON-DEDICATED SMOKE CONTROL SYSTEM. Smoke control components and equipment that are shared with other systems, such as the building HVAC system. Upon activation of fire alarm, non-dedicated smoke control equipment changes mode of operation to achieve the smoke control performance objectives. "Non-dedicated systems" shall refer only to equipment and components controlled from the firefighters' smoke control panel.

NORMALLY CLOSED. A system or vessel in an ABPF used in the storage, production, dispensing, blending, bottling, or handling of Class 1 Liquids that, for up to 50 percent of the time it is in operation, its contents are not exposed to atmosphere and vulnerable to evaporation. Processes involving vessels such as casks opened only for filling, draining or sampling, distillation where all vapors are condensed below their flash point prior to collection, uncovered vessels of 5.3 gallon (20 L) capacity or less used to collect distillate below its flash point, and covered blending or maceration vessels are typically considered normally closed.

NORMALLY OPEN. A system or vessel in an ABPF used in the storage, production, dispensing, blending, bottling, or handling of Class 1 Liquids that, for 50 percent or more of

the time it is in operation, its contents are continuously exposed to atmosphere and vulnerable to evaporation, or where a Class 1 Liquid at or above its flash point is exposed to atmosphere at any time during transfer, dispensing, or release. Continuous blending or maceration in uncovered vessels, open draining of Class 1 Liquids above their flash points, and the act of “bleeding” heads (the initial vapors generated during distillation) or tails (the last vapors generated during distillation) to atmosphere are typically considered normally open.

NUISANCE FIRE ALARM. The activation of any fire alarm system resulting in a response by the Fire Department, caused by mechanical failure, malfunction, improper installation, lack of maintenance or other condition for which Fire Department personnel are unable to determine initiation of a valid alarm signal. (See Sections 401.5, “False Fire Alarm,” and 907.1.5).

OPERATIONS PERMIT. A permit issued in conjunction with the operations listed in Section 105.6.

OPERATOR. A competent person employed by a central alarm station and licensed by the Denver Fire Department to take such action as required for notification of the Denver Fire Department.

OTHER HEALTH HAZARD MATERIAL. A hazardous material which affects target organs of the body, including but not limited to, those materials which produce liver damage, kidney damage, damage to the nervous system, act on the blood to decrease hemoglobin function, deprive the body tissue of oxygen, or affect reproductive capabilities, including mutations (chromosomal damage) or teratogens (effects on fetuses).

OWNER. The owner of the dwelling, dwelling unit and/or rental unit, a mortgagee or vendee in possession, an assignee of rents, receiver, executor, trustee, or any other person, business, sole proprietorship, partnership, association, or corporation directly or indirectly in control of a building, structure or real property or their authorized agent.

PERMITABLE QUANTITY. The minimum amount of hazardous or any other regulated material allowed to be stored or used at a property before an operations permit is required by Section 105.6.

PILE. Independently stacked commodities possibly organized by separate spacers, dunnage, or pallets in which the demise of any storage container on a lower tier compromises the structural stability of the storage system.

PLUG-IN. CO alarm with battery backup, installed by being plugged into an electrical outlet for primary power.

PORTABLE TANK. A tank that is readily capable of being relocated within the facility, not permanently attached to immovable structure or ground, and not constructed of wood.

POST OIL PROCESSING. The process of refining essential oils after the extraction, including but not limited to, dewaxing and winterization processes.

PRESSURE VESSEL. Containers, intermediate bulk containers, processing vessels, and tanks that under normal conditions, are permitted to operate above 15 pounds per square inch gauge (psig; 103.4 kPa).

PROCESS DESCRIPTION. An operational description such as a flow chart of the sequence of events required to convert raw materials from the state in which they enter the APBF through each development point until the finished products are derived. The process description identifies all input and output materials and includes quantities, concentrations, temperatures,

pressures, types of equipment, systems, etc. at each development point using code-based terminology; e.g., “37 gallons of 55% ABV at standard temperature and pressure (STP)” vs. “all the high wines collected.” All systems and processes utilized to produce all intermediate and finished products are required to be included in the description.

PROCESSING VESSEL. An open or closed vessel other than stills used in the manufacture of ethanol mixtures. Processing vessels include fermentation tanks, mash tuns, blending tanks, etc., but do not include long-term storage vessels such as vats or casks.

PROPERTY. As used in this chapter, shall include private and public land in the undeveloped and developed state including the buildings, structures, paving and all other immobile improvements; natural features such as trees, shrubbery and similar botanical growth; and vehicles, vessels, equipment, materials and similar movable items located on them.

RACK. Shelves or similar structural frame-supported system of tiers in which the demise of any storage container on a lower tier does not affect the structural stability of the storage system.

RADIO FREQUENCY MAINTENANCE PLAN. The radio frequency maintenance plan is a document developed and distributed by the building owner for maintaining the radio system from harmful interference generated on the property or otherwise under the control of the owner.

RADIOACTIVE MATERIAL. Any material or combination of materials that spontaneously emits ionizing radiation.

REGULATED MATERIAL. Any material materials regulated by the fire code (as amended) for which an operations permit could be required including storage and/or use of hazardous materials, LPG, combustible dust operations.

RELEASE/UNAUTHORIZED DISCHARGE. Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discharging of barrels, containers, and other receptacles containing any hazardous substances or pollutant or contaminant).

REMOTE AREA. (c.f. NFPA 13). The specified floor area over which an assigned sprinkler density (in volume per minute per unit area) is required in the design of an automatic sprinkler system.

RUNNER. A qualified person who responds to the location where a reported fire alarm system has been activated for the purpose of silencing, restoring, or confirming that the system is restored to a normal condition.

SELF-SERVICE MOTOR FUEL-DISPENSING FACILITY. That portion of motor fuel-dispensing facility where flammable and combustible liquids, liquefied petroleum gas, compressed natural gas, or hydrogen motor fuels are dispensed from fixed approved dispensing equipment into the fuel tanks of motor vehicles by persons other than a motor fuel-dispensing facility attendant.

SENSITIZER. A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical.

SINGLE-FAMILY DWELLING. Any improved real property used or intended to be used as a residence and that contains one dwelling unit.

SINGLE STATION ALARM. A single device comprised of a sensor, alarm-initiating device, control components, and an alarm notification appliance.

SINGLE STATION [CO] ALARM. A device comprised of a sensor, alarm-initiating device, control components, and an alarm notification appliance in one unit.

SLEEPING ROOM. A room furnished with a bed and primarily used for sleeping purposes.

SPIRIT. An ethanol mixture produced by the distillation of wine, wash, or a previously distilled spirit.

STATIONARY TANK. A tank not intended to be relocated that is physically attached to immovable structure or ground.

STILL. Any appliance in which distillation of an ethanol mixture is performed. For the purposes of Chapter 38, still includes pots, columns and condensing coils.

STORAGE AREA. ABPF or portion thereof where ethanol mixtures or materials incorporated or utilized in the manufacture of ethanol mixtures are held for maturation, awaiting transport, or subsequent handling (c.f., use area).

TANK. Any normally open or normally closed vessel having a capacity greater than 60 gallons (230 L) intended for storing or processing (but not transporting outside the facility) Class 1 Liquids, and equipped with provisions for emergency venting.

TENANT. A person or legal entity who rents a dwelling unit from the owner for a fixed period of time usually under the terms of a lease or a similar legal entitlement or agreement.

USE AREA. ABPF or portion thereof where ethanol mixtures or materials incorporated or utilized in the manufacture of ethanol mixtures are actively handled in processes such as fermentation, distillation, rectification, transportation, remixing, dispensing, bottling, blending, etc. (c.f., storage area).

VAT (also Foudre). A stationary tank constructed primarily of wood.

VESSEL. Used in Chapter 38 to reference reservoirs holding – unless otherwise noted – Class 1 Liquids including casks, containers, intermediate bulk containers, processing vessels, and tanks.

WALL HYDRANT. Valved 2-1/2-inch (64 mm) exterior standpipe connection.

WASH (also BEER, MALT LIQUOR). The ethanol mixture intended for distillation produced by the fermentation of mash or wort. For spirit production, wash and wine are analogous as precursors to distillation.

WINE. An ethanol mixture produced by the fermentation of organic products, namely fruits, including agave. For spirit production, wine and wash are analogous as precursors to distillation.

WINERY. An ABPF or portion thereof, including accessory uses, in which wine is produced.

WORT. The sugar solution strained from mash for fermentation.

CHAPTER 3

GENERAL REQUIREMENTS

SECTION 301

GENERAL

Section 301.2 Permits is replaced as follows:

301.2 Permits. Permits shall be required as set forth in Section 105.6 for the activities or uses regulated by Section 303–Asphalt Kettles; Section 304–Combustible Waste Material; Section 306–Motion Picture Projection Rooms and Film; Section 307–Open Burning, Recreational Fires and Portable Outdoor Fireplaces; Section 308–Open Flames; Section 309–Powered Industrial Trucks and Equipment; Section 311–Vacant Premises; Section 314–Indoor Displays; and 315– General Storage.

SECTION 302

DEFINITIONS

Section 302.1 Definitions is amended to read as follows:

302.1 Definitions. The following term is defined in Chapter 2:

ELECTROLYTE

SECTION 304

COMBUSTIBLE WASTE MATERIAL

Section 304.2.1 Required storage conditions is added as follows:

304.2.1 Required storage conditions. Combustible rubbish kept or accumulated within or adjacent to buildings, structures or residential dwelling units shall be in containers complying with this code, or in rooms or vaults constructed of non-combustible materials.

Exception: Storage, accumulation, use and handling of combustible rubbish and waste, newspapers, magazines, etc. not in excess of 10 cubic feet aggregate.

Section 304.3 Containers is replaced as follows:

304.3 Containers. Combustible rubbish, and waste material kept within or near a structure shall be stored in accordance with IFC Sections 304.3.1 through 304.3.6 as amended.

Section 304.3.5 Removal is added as follows:

304.3.5 Removal. Combustible rubbish stored in containers outside of noncombustible vaults or rooms shall be removed from buildings at least once each working day.

Sections 304.3.6 Waste material handling operations and 304.6.1 Permits are added as follows:

304.3.6 Waste material handling operations. Occupancies exclusively performing commercial rubbish handling or recycling shall maintain rubbish or product to be processed or recycled as follows:

1. In approved vaults
2. In covered metal or metal-lined receptacles or bins, or
3. Completely baled and stacked in an orderly manner in an approved location.

304.3.6.1 Permits. A permit shall be required as set forth in Section 105.6 for a Waste Material Handling Plant.

Section 304.3.7 Container location is added as follows:

304.3.7 Container location. A permit shall be required for the installation and maintenance of a waste receptacle with a capacity greater than 20 cubic feet. A site plan depicting the location of the waste receptacle must be submitted for approval prior to installation and anytime the waste receptacle is relocated. Toxic, explosive, flammable, chemical, infectious, radioactive materials and any other hazardous waste shall not be disposed of in the general waste dumpster(s). The waste receptacle(s) shall not be placed within fifteen (15) feet of combustible walls, openings, or combustible roof eave lines. The waste receptacle shall not obstruct emergency vehicular access or positioning for fire ground operations.

SECTION 308 OPEN FLAMES

Section 308.1.4 Open-flame cooking devices is replaced as follows:

308.1.4 Open-flame cooking devices. No gas-fired grills, charcoal grills, or other similar devices used for cooking, heating, or any other purpose, shall not be used or kindled on any balcony or under any overhanging portion or within 10 feet (3 m) of any structure.

Exceptions:

1. One- and two-family dwellings.
2. LP-gas burners having an LP-gas container with a water capacity not greater than 2.5 pounds [nominal 1-pound (0.454kg) LP-gas capacity]. Two extra 1-pound LP-gas containers may be stored on the balcony.
3. Listed natural gas appliances shall be permitted on balconies when installed in accordance with the *International Fuel Gas Code* and supplied by the building's natural gas system.
4. Listed electric ranges, grills, or similar electrical apparatus shall be permitted.

SECTION 309 POWERED INDUSTRIAL TRUCKS

Section 309.2 Battery chargers is replaced as follows:

309.2 Battery-charging operations. Battery-charging operations shall be located in areas designated for such purpose. Where on-board chargers are used, charging shall be accomplished at locations designated for such purpose.

309.2.1 Battery chargers. Battery chargers shall be of an approved type. Combustible storage shall be kept a minimum of 3 feet (915 mm) from battery chargers.

309.2.2 Battery-charging areas. Battery-charging areas shall be kept free of extraneous combustible materials. Battery charging shall not be conducted in areas accessible to the public.

309.2.2.1 Battery-charging area fire protection. Where aggregate electrolyte capacity exceeds 100 gallons, battery-charging areas shall be protected with an automatic sprinkler system in accordance with NFPA 13.

Exception: Automatic sprinklers shall not be required where the amount of electrolyte per battery-charging area is 100 gallons or less and the battery-charging areas are separated by a minimum of 75 feet.

309.2.2.2 Battery-charging area construction. Where aggregate electrolyte capacity exceeds 100 gallons, battery charging areas shall be separated from the other portions

of the building with a one-hour fire barrier constructed in accordance with IBC Chapter 7.

Exceptions:

1. One-hour fire barriers shall not be required where the amount of electrolyte per battery-charging area is 100 gallons or less and the battery-charging areas are separated by a minimum of 75 feet.
2. In buildings that are protected throughout with an automatic sprinkler system in accordance with NFPA 13, one-hour fire barriers shall not be required where the amount of electrolyte per battery charging area is 200 gallons or less and the battery-charging areas are separated by a minimum of 75 feet.

309.2.2.3 Smoking prohibited. Smoking shall be prohibited in battery-charging areas. “No Smoking” signs shall be provided in the charging area in accordance with IFC Section 310.3.

309.2.2.4 Neutralization. An approved method and materials capable of neutralizing a spill from the largest battery to a pH between 5.0 and 9.0 shall be provided.

309.2.2.5 Spill control. Each rack or tray of batteries shall be provided with a liquid-tight 4-inch minimum spill control barrier, which extends at least one-inch beyond the battery rack in all directions. Alternative methods of spill control are subject to approval by the fire code official.

Exceptions:

1. Spill control shall not be required where the amount of electrolyte per battery-charging area is 100 gallons or less and the battery-charging areas are separated by a minimum of 75 feet.
2. In buildings that are protected throughout with an automatic sprinkler system in accordance with NFPA 13, spill control shall not be required where the amount of electrolyte per battery charging area is 200 gallons or less and the battery-charging areas are separated by a minimum of 75 feet.

Section 309.3 Ventilation is replaced as follows:

309.3 Ventilation. Where aggregate electrolyte capacity exceeds 100 gallons, continuous ventilation shall be provided at a rate of not less than 1 cu-ft./min/sq. ft. of designated battery-charging area.

Exceptions:

1. Ventilation systems shall not be required where the amount of electrolyte per area is 100 gallons or less and the battery-charging areas are separated by a minimum of 75 feet.
2. In buildings that are protected throughout with an automatic sprinkler system in accordance with NFPA 13 ventilation systems shall not be required where the amount of electrolyte per battery charging area is 200 gallons or less and the battery-charging areas are separated by a minimum of 75 feet.

Section 309.7 Signage is added as follows:

309.7 Signage. Doors into battery-charging areas shall be provided with approved signs. The signs shall state that:

1. The room contains energized battery systems.
2. The room contains energized electrical circuits.
3. The battery electrolyte solutions are corrosive liquids.

SECTION 315 GENERAL STORAGE

Section 315.4.3 Pile size, aisles and driveways is added as follows:

315.4.3 Pile size, aisles and driveways. Combustible material shall be piled with due regard to stability of piles and in no case higher than twenty (20) feet. When the area used for outside storage exceeds fifty (50) feet, but is less than one hundred fifty (150) feet, in any dimension, aisles of not less than eight (8) feet clear width shall be provided between piles. When the area used for outside storage exceeds one hundred fifty (150) feet in any dimension, a driveway between and around piles shall be at least fifteen (15) feet in width and maintained free of rubbish, equipment or other articles or materials. Driveways shall be so spaced that a maximum grid system unit of fifty (50) feet by one hundred fifty (150) feet is produced.

SECTION 316 HAZARDS TO FIRE FIGHTERS

Section 316.7 Fences, walls, retaining walls and similar barriers is added as follows:

316.7 Fences, walls, retaining walls, and similar barriers. The use of barbed wire or any other sharp-pointed material, devices or features that deliver a physical or health hazard on, as, or on top of, fences, walls, retaining walls, or similar barriers, regardless of height, is prohibited except as provided in accordance with Section 316.7.1.

Exception: Barbed wire may be installed where approved by the Fire Code Official and a permit is obtained in accordance with Section 105.6.

Section 316.8 Confined spaces is added as follows:

316.8 Confined spaces. Tanks that contain materials that would not contain enough oxygen to support life or contain a toxic atmosphere shall have at each entry point; a warning sign posted indicating the need for procedures for safe entry into confined spaces.

CHAPTER 4

EMERGENCY PLANNING AND PREPAREDNESS

SECTION 401 GENERAL

Section 401.1 Scope is amended by deleting the Exception.

Section 401.3 Emergency responder notification (subsections 401.3.1 through 401.3.3 are deleted) is replaced as follows:

401.3 Emergency responder notification. In the event of an emergency, including but not limited to, unwanted fire, hazardous materials discharge, medical incident, or environmental calamity including utility malfunction, occurs on a property, the owner, occupant, or other person in responsible charge of the property or portion thereof, including tenants employees and property or equipment maintenance personnel, shall immediately report the emergency to 911 unless the Fire Department has approved an alternative emergency procedure for the event. Building employees, tenants and maintenance personnel shall implement the appropriate emergency plans and procedures. No person shall, by any means, require or otherwise purposely cause any delay in the reporting of an emergency.

Section 401.3.1 Evidence of emergency is added as follows:

401.3.1 Evidence of emergency. Upon discovery of evidence of an unwanted fire, hazardous materials discharge, medical incident, or environmental calamity, even though it appears to have been extinguished or otherwise stabilized, the owner, occupant, or any other person in responsible charge of the property or portion thereof, including tenants, employees and property or equipment maintenance personnel shall immediately notify the Fire Department of the evidence including what is known of the location and circumstances. Such evidence shall not be disturbed, thus preserving data for the Fire Department to conduct an investigation.

401.3.2 Elevator entrapment communication procedures. Upon an entrapped party's activation of the elevator car 2-way communication system required by ASME A17.1, the authorized personnel receiving the call (call recipient), shall request the following information:

1. The number of occupants in the car; and
2. Whether any occupants are in medical distress; and
3. Whether smoke or fire is apparent; and
4. Whether any occupant has a physical or mental handicap

If the response to 2, 3 and 4 above are all negative and the call recipient is located at a call center remote from the elevator location, the call recipient shall immediately notify the appropriate emergency contact for the property. Once known, the call recipient shall provide the trapped party with the estimated time of arrival of assistance.

The call recipient shall immediately notify the Fire Department if any of the following occur:

1. The response to either 2, 3 or 4 above is affirmative.
2. Communication with a trapped party is lost prior to obtaining the information required above and cannot be re-established within 5 minutes.
3. The expected authorized building or elevator contractor or technician is unable to respond within 20 minutes of the first notification of entrapment.
4. There is contact from the same stalled elevator 20 minutes after the original call indicating that help has not arrived.

401.3.3 Procedures. Written emergency evacuation procedures shall be made and kept on the premises. The procedures shall identify the hazards and safety precautions required in

evacuating passengers from a stalled elevator. After responding to a trapped party incident, the fire department shall be notified immediately if any of the following occur;

1. Authorized building personnel responding to the incident determine that the elevator platform is not securely established within 7 inches of a landing.
2. Qualified elevator personnel responding to the incident determine that the elevator platform cannot be securely established within 18 inches of a landing.
3. It is found by any responding party that; any trapped occupants are in medical distress, smoke or fire is apparent and/or any occupant has a physical or mental handicap.

Any personnel responding to an elevator trapped party incident may contact the fire department at any time during the event as they deem necessary.

401.3.4 Records. A record of authorized and sufficiently trained personnel responsible to respond to a trapped party elevator incident shall be maintained on the premises. Records of elevator entrapment incidents shall be maintained on site to include; date, time of responder arrival, car designation, number of trapped occupants, event resolution, cause, and remedial action taken.

Section 401.5 Making false report is replaced as follows:

401.5 False alarm. No person shall deliberately or maliciously report a fire or unauthorized discharge of hazardous materials when that person knows that no fire or discharge exists. The person responsible for the false alarm shall reimburse the City for the total cost of responding to the false alarm.

Section 401.9 Misleading information is added as follows:

401.9 Misleading information. It shall be unlawful for a person to willfully make any false, fraudulent, misleading, or unfounded report or statement or to willfully misrepresent any fact with the intention of misleading any Fire Department personnel or interfering with Fire Department operations.

**SECTION 402
DEFINITIONS**

Section 402.1 Definitions is amended as follows:

402.1 Definitions. The following term is defined in Chapter 2:

PROPERTY

**SECTION 403
EMERGENCY PREPAREDNESS REQUIREMENTS**

Section 403.8.1.6 Resident participation in drills is replaced as follows:

403.8.1.6 Resident participation in drills. Emergency evacuation drills shall involve the actual evacuation of residents to a selected assembly point.

Section 403.12.2 Public safety plan for gatherings is amended by adding the following to the list of items required to be addressed in the public safety plan:

- Fire hydrant locations
- Local fire protection (suppression and alarm)
- Public assembly areas
- Emergency procedures and employee training

- All other conditions possibly hazardous to life, property or public welfare in the occupancy

Section 403.13 Facility manager certification is added as follows:

403.13 Facility manager certification. All personnel responsible for facility maintenance, fire safety emergency procedures, evacuation plans, evacuation drills, employee training and response procedures, hazard communication, resident training, tenant identification, emergency response team formulation and training, hazardous materials management plans, hazardous materials inventory statement, etc. shall complete a training course and shall have a current certification.

SECTION 404

FIRE SAFETY EVACUATION AND LOCKDOWN PLANS

Section 404.2 Contents is replaced as follows:

404.2 Contents. Fire safety and evacuation plan contents shall be in accordance with IFC Sections 404.2.1, 404.2.2 as amended and Denver Fire Department policy on Emergency Procedures and Emergency Evacuation.

Section 404.2.2 Fire safety plans is amended by adding item 8 as follows:

8. Provide a description of the building's life safety systems including fire alarm, fire sprinkler (including special suppression, standpipes, fire pumps, etc.), smoke control, elevator recall, areas of refuge, emergency power, etc.

SECTION 405

EMERGENCY EVACUATION DRILLS

Section 405.1 General is amended by adding the following after the last sentence:

It shall be unlawful to refuse to participate or to interfere with Fire Department personnel conducting an emergency evacuation drill.

Section 405.10 Extent of evacuation is added as follows:

405.10 Extent of evacuation. Fire and evacuation drills shall include the complete evacuation from the building of all persons required to participate. It shall be a violation of this code to refuse to participate or to interfere with the Fire Department personnel conducting a fire and evacuation drill.

CHAPTER 5

FIRE SERVICE FEATURES

SECTION 502 DEFINITIONS

Section 502.1 Definitions is amended as follows:

502.1 Definitions. The following term is defined in Chapter 2.

LOWEST LEVEL OF FIRE DEPARTMENT VEHICLE ACCESS

SECTION 503 FIRE APPARATUS ACCESS ROADS

Section 503.1.1 Buildings and facilities is amended by adding the following to the end of the last sentence:

...and the interior of all courts (also see Section 504.5). The approved route shall not be less than a 3-foot wide access walkway leading from fire apparatus roads to all portions of the exterior walls of the first floor.

Section 503.1.1 Buildings and facilities, Exception 1, item 1.1 is replaced and Exception 3 is added as follows:

- 1.1 Where a building is equipped throughout with an approved automatic sprinkler system installed in accordance with IFC Sections 903.3.1.1 or 903.3.1.2, the 150 feet dimension may be increased to 250 feet.
3. A lesser width may be provided when approved by the Fire Code Official.

Section 503.2.1 Dimensions is replaced as follows:

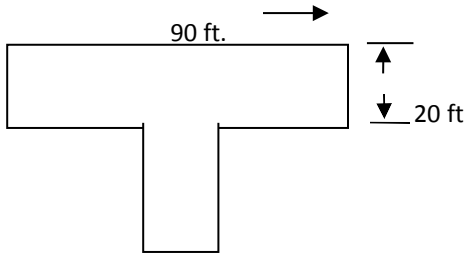
503.2.1 Dimensions. Fire apparatus access roads shall have an unobstructed width of not less than Table 503.2.1, exclusive of shoulders, except for approved security gates in accordance with Section 503.6 and an unobstructed vertical clearance of not less than 13 feet 6 inches.

Exception: Existing fire apparatus access roads shall have an unobstructed width per Table 503.2.1.

Table 503.2.1

Minimum Clear Street Widths for Existing Emergency Fire Apparatus Access Roads

Note: This table does not apply to new fire apparatus access roads. Rather, this table applies when development of a use identified in the table occurs along an existing fire apparatus access road and the existing road does not comply with International Fire Code unobstructed width requirements for a newly constructed fire apparatus access road. If the existing unobstructed width is greater than the widths listed in this table, but less than the width for new fire apparatus access roads (i.e., 20 feet), then the existing unobstructed width shall not be reduced.

Type of Building/Structure To Be Served by Existing Fire Apparatus Access Road	Minimum Unobstructed Width ^{1,2}
Single-family detached buildings, two-dwelling unit attached buildings, or townhouses with alleys	16 feet
Single-family detached buildings, two-dwelling unit attached buildings, or townhouses without alleys but with driveways that extend to the road	16 feet
Single-family detached buildings, two-dwelling unit attached buildings, or townhouses without alleys or driveways that extend to the road	16 feet
Multi-family residential buildings, three (3) stories or less AND with 15 or less dwelling units per building ³	16 feet
<ul style="list-style-type: none"> Multi-family non-high-rise buildings, four (4) or more stories OR with 16 or more dwelling units per building³ Non-residential non-high rise buildings/structures 	20 feet with an additional 40-foot (length) of “no parking” fire lane at the main entrance of the building. If 25 feet or greater unobstructed width is provided, a 40-foot “no parking” fire lane is not required.
High-rise buildings/structures ³	<p>20 feet with an additional 40 feet (length) of “no parking” fire lane at the main entrance of the building. If building/structure is located on a corner, 20 feet is required on 2 sides of the building.</p> <p>If 25 feet or greater unobstructed width is provided, a 40-foot “no parking” fire lane is not required.</p>
Cul-de-sac	90 feet in diameter
<p>Hammerhead turnaround</p> 	20 feet wide by 90 feet long

¹ Based on 8 ft. parking and 18 inch curb-to-tire widths, unless a 7 ft. parking lane is allowed by the City of Englewood Public Works and the Fire Marshal's Office.

² Where a fire apparatus access road serves two or more uses, the larger required minimum unobstructed width shall be maintained.

³ A multi-family building with commercial on the first floor shall comply with the non-residential non- high-rise minimum clear width requirement, except that high-rise buildings/structures shall comply with high-rise minimum clear width requirement.

Section 503.2.3 Surface is replaced to read as follows:

503.2.3 Surface. All-weather permanent fire access surfaces shall be asphalt, concrete, or other approved surface. Temporary fire access surfaces during construction are permitted to consist of a gravel road base or asphalt or other approved surface. Denver Fire Department apparatus specifications will be used to determine loading requirements.

Section 503.2.3.1 Private fire apparatus access road surface design is added as follows:

503.2.3.1 Private fire apparatus access road surface design. Design of private fire apparatus access roads shall meet the requirements specific to the Denver Fire Department apparatus specifications, which will be used to determine loading requirements.

Section 503.2.4 Turning radius is replaced as follows:

503.2.4 Turning radius. The required turning radius of a fire apparatus access road shall be a minimum of 25 feet inside and 50 feet outside.

Section 503.2.6.1 Grade-level structural deck is added as follows:

503.2.6.1 Grade-level structural deck. All structural decks shall have permanent, all-weather load posting sign(s) indicating gross maximum vehicle loads, maximum tandem axle load and maximum single-axle load. Signs shall be posted in a conspicuous location at each deck entrance and shall be maintained by the owner at all times.

Sections 503.6.1 Width and 503.6.2 Approved means of emergency operation are added as follows:

503.6.1 Width. Security gates across a fire apparatus access road shall be a minimum 16 feet wide.

503.6.2 Approved means of emergency operation. Secured gates across a fire apparatus access road shall be provided with one or more of the following features:

1. Key box in accordance with IFC Section 506.
2. An approved lock
3. Chains used to secure gates shall be ¼-inch maximum, non-case hardened steel.
4. Emergency operation approved by Fire Code Official.

SECTION 504

ACCESS TO BUILDING OPENINGS AND ROOFS

Section 504.1 Required access is amended by adding the following at the end of the paragraph:

A five-foot wide (1524 mm) access walkway leading from fire apparatus access roads to required exterior openings shall be provided. The location and configuration shall be approved by the Fire Code Official.

Exception: The Fire Code Official is allowed to require a lesser width.

Section 504.4 Roof hatches is added as follows:

504.4 Roof hatches. See Section 1011.12.2.1.

Section 504.5 Courts is added as follows:

504.5 Courts. Access to grade level courts shall be provided from two remote locations. Access points shall be comprised of breezeways not less than 6 feet (1829 mm) wide and not less than the height of the first story of the building. Locations shall be approved by the fire code official (see also IFC Sections 202, 1004.5, 1028.4 and IBC Section 1206.3).

SECTION 505 PREMISES IDENTIFICATION

Section 505.1 Address identification is replaced and an Exception added as follows:

505.1 Address identification. New and existing buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be not less than 4-six inches (102 mm) high with a minimum stroke width of 3/4 inch (12.7 mm). Where required by the Fire Code Official, address identification shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. Address identification shall be maintained.

Exception: Existing dwellings regulated by the IRC.

SECTION 507 FIRE PROTECTION WATER SUPPLIES

Section 507.2 Type of water supply is replaced as follows:

507.2 Type of water supply. A water supply shall be connected to a reliable public water works system.

Section 507.2.1 Private fire service mains is deleted in its entirety.

Section 507.2.2 Water tanks is replaced as follows:

507.2.2 Water tanks. New water tanks for fire protection shall be prohibited.

Exceptions:

1. Water tanks for fire protection, when approved by the Fire Code Official, are permitted for NFPA 13D systems in accordance with IFC Section 903.3.1.3 or IRC Section P-2904.
2. Existing water tanks for fire protection that were previously approved by the Fire Department. These tanks shall be inspected, tested and maintained in accordance with NFPA 25.

Section 507.2.3 Water supply serving high-rise buildings is added:

507.2.3 Water supply serving high-rise buildings. High-rise buildings shall be supplied by connections to a minimum of two public water mains located in different streets. Separate supply piping shall be provided between each water main connection and the building. Required backflow prevention devices and flow switches shall be provided at each water main entry to the structure. Each fire main shall be sized to meet the full demand of the fire protection system at each connection to achieve redundancy.

Exception:

Where approved by the Fire Code Official, high-rise buildings without access to different water mains shall have two fire main connections to the same public main. The public main shall have valves such that an interruption of one water source can be isolated so that water supply will continue without interruption through the other connection. The two required fire mains shall have a minimum separation distance from each other of five (5) feet at all points from the public main to the building. Each fire main shall be sized to meet the full demand of the fire protection system at each connection to achieve redundancy.

Section 507.3 Fire flow is replaced as follows:

507.3 Fire flow. Fire flow requirements shall be as determined in IFC Appendix B, as amended. Each new or existing fire hydrant as required in accordance with IFC Appendix C, as amended, shall be capable of providing not less than 1500 GPM at 20 PSI residual pressure.

Section 507.5.1 Where required is replaced as follows:

507.5.1 Where required. See Section 507.3.

Section 507.5.3 Private fire service mains and water tanks is replaced as follows:

507.5.3 Private fire service mains and water tanks. Private fire service mains and water tanks are not permitted except for existing systems previously approved by the Fire Department or as allowed in Section 507.2.2. Existing private service mains and water tanks shall be periodically inspected, tested and maintained in accordance with NFPA 25 at the following intervals:

1. Private fire hydrants (all types): Inspection annually and after each operation; flow test and maintenance annually.
2. Fire service main piping: Inspection of exposed, annually; flow test every five years.
3. Fire service main piping strainers: Inspection and maintenance after each use.

**SECTION 508
FIRE COMMAND CENTER**

Section 508.1 General is replaced as follows:

508.1 Fire command center (FCC). Where required by Section 907, buildings shall be provided with an FCC in accordance with this section. No piping, ducts or equipment foreign to required fire operations shall be permitted to enter, pass through or be installed within the FCC. Scale drawings of the FCC showing the location of all equipment and features, in plan and elevation views, shall be submitted for approval prior to installation.

Section 508.1.1 Location and access is replaced as follows:

508.1.1 Location and access. The FCC shall:

1. Be on the ground floor, and
2. Have a secured entrance directly accessible to and in immediate proximity of the main building entrance.
3. Have access within the building to all fire service access elevators.

Exception: Unless otherwise approved by the Fire Code Official.

Section 508.1.2 Separation is replaced as follows:

508.1.2 Separation. To meet the system survivability requirements of NFPA 72, the FCC shall be separated from the remainder of the building by not less than a 2-hour fire barrier constructed in accordance with IBC Section 707 or a horizontal assembly in accordance with IBC Section 711 or both.

Section 508.1.6 Required features is replaced as follows:

508.1.6 Required features. The FCC shall contain the following:

1. Emergency voice/alarm communication system unit in accordance with IFC Section 907.5.2.2, as amended.
2. Fire Department communication system in accordance with Section 907.2.13.2.
3. Fire alarm control unit and annunciator in accordance with Sections 907.1.5 and 907.6.4.1.

4. Elevator status/control panel in accordance with Section 907.2.13.6.
5. Firefighter's smoke control panel in accordance with Section 909.8.
6. Approved manual controls for simultaneously unlocking stairway and refuge area doors.
7. Emergency generator status panel in accordance with Section 907.2.13.7.
8. Telephone with controlled access to a public telephone network.
9. Fire pump remote status panel in accordance with Section 907.2.13.8.
10. Building as-built construction plans indicating typical floor and roof plans, detailing the building core, means of egress, fire protection system drawings, firefighting equipment, fire department access, interior generator and utility shut-off locations. These drawings shall be protected from damage and immediately accessible to the fire department. A storage rack to support these drawing shall be provided.
11. Building site plan with "North" orientation, local street intersection, fire hydrants, Fire Department connections, building entries, exterior generator and fuel locations and exterior utility shut-off locations.
12. Work table 3' x 5' and chair.
13. Public address system equipment, where specifically required by other sections of this code.
14. A Knox Box key vault approved by the fire department to house keys to access mechanical and electrical equipment.
15. Two-way communication required by: IFC Sections 1009.6.5 and 1009.8, as amended, IBC Section 3008.6.6 and two-way communication system required for elevator communication in accordance with ASME A17.1.
16. Multi-level lighting control. Separately switched lamps or dimming control is acceptable. Dimming of fluorescent fixtures shall be by EMI/RFI shielded devices.
17. Mass Notification System (MNS) equipment
18. Heating/cooling zone or system.

508.1.7 Heating/cooling zone or system for FCC. A separate heating/cooling zone or system operating continually shall be provided for the Fire Command Center.

SECTION 509

FIRE PROTECTION AND UTILITY EQUIPMENT IDENTIFICATION AND ACCESS

Section 509.3 Access to fire pumps is added as follows:

509.3 Access to fire pumps. Access to fire pumps in new buildings shall be located at grade level with direct access to outside or located one level below grade. Pump rooms that are located one level below grade shall be placed such that there are no intervening rooms between the stairway door serving that level and the pump room. Door serving the pump room shall be within 25 ft. of the stairway door. The stairway that serves the lower level shall exit directly to outside. Where a dedicated stairway is provided to access the pump room and mechanical rooms, stairway width shall not be less than 36 inches.

Section 510 Emergency Responder Radio Coverage is replaced as follows:

SECTION 510

EMERGENCY RESPONDER RADIO ENHANCEMENT COVERAGE SYSTEM (RES)

510.1 Emergency responder radio enhancement system coverage in buildings. Where required by Section 916, buildings shall have approved radio coverage for emergency responders (Englewood Police Department and Denver Fire Department) within the building based upon the existing coverage levels of the Department of Safety communication system at the exterior of the building. Systems shall operate at the frequency of 806-816MHz and 851-861MHz. This section shall not require improvement of the existing Department of Safety communication system. Active components Bi-directional Amplifiers (BDA), Distributed Amplifier System (DAS) controller, UPS), of the RES system shall be installed in a room separated from the remainder of the building by a minimum 1-hour fire-resistance rated fire barrier constructed in accordance with IBC Section 707 or a one hour fire resistance rated horizontal assembly constructed in accordance with IBC Section

711 or both. The Emergency Responder Radio Enhancement Coverage system shall be a standalone system totally dedicated to public safety and no components of this system may be shared with any other radio or cell phone systems. Modification, alteration, repair or removal of any RES system or component is specifically prohibited without the approval of the fire code official.

Exception: Where the Fire Code Official determines that current radio coverage within the building is adequate, written documentation of the compliance of radio coverage determines it shall be maintained on site. See Section 916 for testing requirements.

510.1.1 Coverage Requirement. The radio system control channel signal level shall exceed -100 dBm at 95% or more of the locations measured within each floor plate. Equivalently, the service area reliability shall be 95% or greater on each floor of the structure and parking areas. All designated areas of refuge, Fire Command Centers, stairwells, main building lobbies and elevator lobbies shall have 100% signal coverage of -100dBm or stronger.

510.2 Radio systems. The RES system shall meet the coverage requirements defined in this section, and comprise one of following; bi-directional amplifiers with radiating ("leaky coax") cable, a discrete distributed antenna system or other fire department approved equivalent technology. Radio communications systems shall only operate on the frequency range of 806-816MHz and 851-861MHz. All active electronic components in the RES system shall be powered by a dedicated uninterruptible power source (UPS) with a minimum backup time of 12 hours with all amplifiers at rated output. The UPS input circuit shall be a dedicated circuit and any cord and plug connection(s) shall be secured in an approved cabinet to prevent inadvertent disconnection. The circuit shall also be connected to the emergency generator where one is provided. The circuit shall be provided with a "lock-on" device. The RES system shall be maintained in an operative condition at all times.

Exceptions:

1. In buildings provided with an emergency generator in accordance with IFC Section 604, as amended, UPS minimum battery capacity shall be permitted to be 4 hours.
2. Where a legally required standby generator is installed in accordance with IFC Section 604, as amended and the UPS input circuit is automatically transferred to the generator source, UPS minimum battery capacity shall be permitted to be 4 hours.

510.2.1 Requirements. The system shall effectively operate throughout the structure in accordance with this section. Radio communication coverage is required throughout parking garages and all areas below grade. Acceptance of the installed communication system shall be based upon Fire Department and Police Department approval of the acceptance test as described below. All RES equipment shall be FCC compliant.

510.2.1.1 Acceptance test. Test procedures shall comply with Denver Fire Department and Englewood Police Department. Measurement locations shall be uniformly distributed to the extent practical. There shall be at least 10 sampling measurements per 4,000 sq. ft. (one per every 20 foot X 20 foot square) of gross building area. Adequate radio coverage shall be determined for the structure and parking areas separately. Elevators, stairways and enclosed areas within each grid must be included in the testing. Where grid points exhibit marginal RF signal levels, DFD personnel will perform a radio test to determine if intelligible transmissions can be made through the enhanced radio system to and from the individual grid point without the need for retransmission. If this test fails, communications will be considered inadequate at that grid location and that grid will have failed to meet the required signal level.

510.2.1.2 Periodic testing. RES shall be tested annually and at five-year. Additional testing may be required by the Denver Fire Department where building modifications have the potential to degrade system performance.

510.2.1.3 Failure detection. RES equipment, including the RES amplifier and DAS controller if available, shall have failure detection circuitry which provides detection of mechanical,

electrical and power failure of these components, as well as oscillation detection capability which will reduce the amplifier output to zero in the event of system oscillation. Detection of any failure output from an amplifier or main DAS controller, if provided, shall annunciate at the building fire alarm panel and result in a distinct local audible notification and transmission of a supervisory signal to the central monitoring station. RES system repairs shall be accomplished within 72 hours.

510.2.1.4 Permits. A construction permit is required prior to installation or replacement of any RES. Submittal and approval of shop drawings are required to obtain a permit. Permits shall only be issued to companies possessing a current Contractors license. An annual Fire permit for the RES shall be obtained and maintained current by the building owner. Alterations, modifications, repairs and required testing of RES shall require an operational permit issued by the department to the licensed contractor performing the work.

510.2.1.5 Information signs. A legible sign stating “**THIS BUILDING IS EQUIPPED WITH A PUBLIC SAFETY RADIO REPEATER SYSTEM**” shall be conspicuously posted at the fire alarm panel. An additional sign stating “**THIS BUILDING IS EQUIPPED WITH A PUBLIC SAFETY RADIO REPEATER SYSTEM-- DO NOT TAMPER WITH OR DISCONNECT,**” shall be located at each RES amplifier location. Signs shall be constructed of plastic or metal and shall be approved by the Fire Code Official.

510.2.1.6 Shop drawings. Shop drawings, including RF grids, shall be submitted in accordance with Appendix N and approved prior to installation of any RES. Drawings shall be a deferred submittal. Three (3) sets of scaled, engineered hardcopy installation shop drawings shall be provided in addition to one set of all documents in electronic format (.pdf). Documents shall be of sufficient clarity and detail to fully describe the proposed installation and equipment. Handwritten notes or comments on drawings are not acceptable.

510.3 Wiring methods. Installation wiring for radio communications shall comply with the manufacturer’s recommendations, equipment listings. NFPA 72 and NFPA 70 (NEC). Radiating cables shall be FCC type approved and installed using manufacturer’s specifications to secure cables to the supporting structure. All terminations shall be made with manufacturer’s approved devices. Cable cuts shall be made with manufacturer approved tools and methods. Limited-use cable is not permitted. All membrane or through penetrations shall comply IBC Section 714.

510.3.1 RES riser cable in high-rise buildings. In high rise buildings, installation of riser cable and amplifiers for distributed antenna systems shall be located in stacked electrical rooms or telephone rooms or shaft enclosures separated from the remainder of the floor by not less than a one-hour fire resistance rated fire barrier shaft constructed in accordance with IBC Section 707 or 713. Wiring runs from an RES unit amplifier to a riser shall be separated from the remainder of the building by a minimum 1-hour fire-resistance rated fire barrier constructed in accordance with IBC Section 707 or a one-hour fire-resistance rated horizontal assembly constructed in accordance with IBC Section 711, or both.

510.3.1.1 RES riser cable in non-high rise buildings. In building construction type of V-A, Heavy Timber, III-A, II-A, I-A, and I-B installation of riser cable and amplifiers for distributed antenna systems shall be located in stacked electrical rooms, telephone rooms or shaft enclosure separated from the remainder of the floor by not less than a one-hour fire-resistance rated fire barrier constructed in accordance with IBC Section 707 or 713. Wiring runs from an RES unit amplifier to a riser shall be separated from the remainder of the building by a minimum 1-hour fire-resistance rated fire barrier constructed in accordance with IBC Section 707 or a one-hour fire-resistance rated horizontal assembly constructed in accordance with IBC Section 711, or both.

510.4 Maintenance. Maintenance of the RES shall be the responsibility of the building owner and requires an operational permit issued by the department for any maintenance, repair or modification work. The building owner shall maintain a service contract for emergency repair with response to the site within two (2) hours of notification.

510.4.1. Radio frequency maintenance plan. A radio frequency maintenance plan shall be developed which prohibits use of electrical/electronic equipment which cause degradation to the RES. The radio frequency maintenance plan shall comply with the following at a minimum:

1. Prohibit the use of any electronic systems known to degrade the effectiveness of RES communications.
2. Permit site access during reasonable business hours when necessary to assess the source of interference to RES communications.
3. Be incorporated into the lease of every tenant.

510.5 Installer certification. No contractor shall install, modify, repair, alter or replace an RES without a valid Fire Permit. All field installers shall be individually certified by the manufacturer for the equipment being installed. Each certified installer shall be permitted to supervise one apprentice/helper.

510.6 Records. Records of all system inspections, RES uplink and downlink gain settings, maintenance, annual tests and five-year test results shall be maintained on the premises in the "RES System Maintenance and Test Results Log Book" which shall remain on the building premises and shall be available to the fire code official upon request.

CHAPTER 6

BUILDING SERVICES AND SYSTEMS

SECTION 603

FUEL-FIRED APPLIANCES

Section 603.8.1 Residential incinerators is replaced as follows:

603.8.1 Residential incinerators. Residential incinerators are prohibited within the City of Englewood.

SECTION 604

EMERGENCY AND STANDBY POWER SYSTEMS

Section 604.1.1 Stationary generators is amended by adding the following to the last sentence:

Stationary emergency and standby power generators required by this code shall be listed in accordance with UL 2200 and operated by a diesel-fueled prime mover.

Section 604.1.1.1 Optional standby generators is added as follows:

604.1.1.1 Optional standby generators shall be permitted in accordance with NFPA 70 (NEC) Article 702. Generators shall be fueled by a diesel or natural gas fuel source. Gaseous fuels shall be provided by a public utility and piped to the unit. Where diesel-fueled generators are located at other than grade level, individual fuel tank capacity shall not exceed 120 gallons, with a total capacity not to exceed 660 gallons on any building story or level.

Section 604.1.2 Installation is amended by adding the following after the last sentence:

All generators shall be provided with a remote status panel in accordance with NFPA 110 and complying with Section 907.2.13.7. Optional standby generators shall also be provided with a remote status panel. Panel location shall be in an area approved by the Fire Code Official.

Section 604.1.4 Load duration is replaced to read as follows:

Emergency power systems and standby power systems shall be designed to provide the required power for a minimum duration of 2 hours without being refueled or recharged, unless specified otherwise in this code. If fuel pumping is required from a main fuel tank to a day tank, a duplex pumping system shall be provided. Fuel storage and handling shall comply with IFC Chapter 57, as amended. Fuel supplies for emergency or required standby systems shall be located on-site.

Exception: Emergency generators supplying fire pumps shall have a fuel supply for eight hours of simultaneous operation of all connected emergency equipment.

Section 604.1.5 Uninterruptable power source is replaced as follows:

604.1.5 Stored energy emergency or standby power systems. Stored energy emergency and standby power systems required by this code shall be installed in accordance with IFC Section 608, as amended, and NFPA 111 and shall have sufficient capacity to operate under full load for 90 minutes.

Section 604.1.9 Location is added as follows:

604.1.9 Location. All generators required by this code shall be located at grade level, or one level below grade with the filling connection located in accordance with IFC Chapter 57, as amended. Enclosure provisions shall comply with NFPA 110.

Exceptions:

1. Stationary emergency and legally required standby power generators in a stand-alone open parking garage less than 55' in height, shall be permitted to be located on the topmost atmospheric level.
2. Stationary emergency generators located in a stand-alone utility plant are permitted to be located one level above the level of exit discharge with a fuel capacity of not more than 240 gallons on that level.
3. Stationary emergency and legally required standby power generators shall be permitted to be located at one level above grade where all of the following are met:
 - a. Individual fuel tank capacity shall not exceed 120 gallons at the generator day tank.
 - b. Supply tank shall be provided at grade level with filling connection located in accordance with IFC Chapter 57, as amended.
 - c. Duplex pumping system shall be provided between the supply tank and generator day tank.
 - d. The aggregate capacity of fuel tanks shall not exceed 660 gallons.

Section 604.2.1 Elevators and platform lifts is amended by adding the following to the end of the paragraph:

Standby power for platform lifts shall comply with ASME A18.1.

Section 604.2.3 Emergency responder radio coverage systems is replaced as follows:

604.2.3 Emergency responder radio coverage systems. Emergency power shall be provided for emergency responder radio coverage systems in accordance with Section 510.2.

Section 604.2.9 High-rise buildings is replaced as follows:

604.2.9 High-rise buildings. Emergency power shall be provided for high-rise buildings as required in IBC Section 403 and shall be in accordance with IFC Section 604, as amended.

Section 604.2.15 Smoke control systems is replaced as follows:

604.2.15 Smoke control systems. Standby power shall be provided for smoke control systems as required in Section 909.11.

Section 604.2.17 Covered mall buildings is added as follows:

604.2.17 Covered mall buildings. Covered mall buildings exceeding 50,000 square feet (4,645 m²) shall be provided with emergency power systems which are capable of operating the emergency voice/alarm communication system, the smoke control system, where provided, in accordance with Section 909, the fire pump and one accessible elevator.

**SECTION 606
MECHANICAL REFRIGERATION**

Section 606.8 Refrigerant detector is replaced as follows:

606.8 Refrigerant detector. Machinery rooms shall contain refrigerant leak detection and initiate an emergency alarm in accordance with this section and Section 908.8. The detectors or sampling tubes that draw air to the detectors shall be located in areas where refrigerant from a leak will concentrate. A leak detection alarm shall be actuated at a value not greater than the corresponding occupational exposure limit (OEL) values identified in the *International Mechanical Code* for the refrigerant classification. Accurate detector calibration shall be demonstrated during acceptance testing. Signage required by Section 908.8 shall state, **“DO NOT ENTER WHEN LIGHT IS FLASHING – REFRIGERANT LEAK DETECTED.”**

SECTION 607

ELEVATOR OPERATION, MAINTENANCE AND FIRE SERVICE KEYS

Section 607.1 Emergency operation is replaced as follows:

607.1 Operation. New and altered elevators and conveying systems shall comply with Section 919 and IBC Chapter 30, as amended. Elevators undergoing a controller replacement or alteration as defined in Colorado Code of Regulations 7CCR 1101-8 or ASME A17.1 shall be provided with Phase I emergency recall operation and Phase 2 emergency in-car operation. Existing elevators with a travel distance of 25 feet (7620mm) or more shall comply with the requirements of IFC Chapter 11, as amended. All other alterations to existing elevators shall comply with State of Colorado requirements.

Section 607.2 Standby power is amended to read as follows:

607.2 Emergency or standby power. In buildings and structures where emergency or standby power is required or furnished to operate an elevator, emergency or standby power shall be provided in accordance with IFC Section 604, as amended. Operation of the system shall be in accordance with Sections 607.2.1 through 607.2.4. an illuminated indicator shall be provided in the elevator lobby(ies) at the designated level in accordance with ASME A17.1.

Section 607.2.1 Manual transfer is amended to read as follows:

607.2.1 Manual transfer. Emergency or standby power shall be manually transferable to all elevators in each bank.

Section 607.2.2 One elevator is amended to read as follows:

607.2.2 One elevator. Where only one elevator is installed, the elevator shall automatically transfer to emergency or standby power within 10 seconds for an emergency power source and 60 seconds for a standby power source after failure of normal power.

Section 607.2.3 Two or more elevators is amended as follows:

607.2.3 Two or more elevators. Where two or more elevators are controlled by a common operating system, all elevators shall automatically transfer to emergency or standby power within 10 seconds for an emergency power source and 60 seconds for a standby power source after failure of normal power where the emergency/standby power source is of sufficient capacity to operate all elevators at the same time. Where the emergency/standby power source is not of sufficient capacity to operate all elevators at the same time, all elevators shall transfer to emergency/standby power in sequence, return to the designated landing and disconnect from the emergency/standby power source. After all elevators have been returned to the designated level, not less than one elevator shall remain operable from the emergency/standby power source.

Section 607.2.3.1 Two or more elevators in high-rise buildings without fire service access elevators is added as follows:

607.2.3.1 Two or more elevators in high-rise buildings without fire service access elevators. In high-rise buildings without fire service access elevators, not less than two elevators shall remain simultaneously operable from the emergency power source. One of these elevators shall be the elevator required to accommodate an ambulance stretcher. All elevators shall be manually transferable to the emergency power source in accordance with Section 607.2.1.

Exception: Sufficient emergency power shall be provided for not less than one elevator that only serves open parking levels of the high-rise building.

Section 607.2.3.2 Elevators in high-rise buildings with fire service access elevators, but without occupant evacuation elevators is added as follows:

607.2.3.2 Elevators in high-rise buildings with fire service access elevators, but without occupant evacuation elevators. In high-rise buildings with fire service access elevators, but without occupant evacuation elevators, no less than three elevators shall remain simultaneously operable from the emergency power source and elevators shall be capable of accessing all floors of the building. Where an elevator transfer floor is provided in order to provide access to all building floors, a minimum of five elevators shall be required for simultaneous operation on the emergency power source. Emergency power shall be provided to the required fire service access elevators in accordance with IBC Section 3007.8, as amended. The designated non-fire service access elevator(s) shall be capable of having the emergency power manually transferrable to any other non-fire service access elevator(s) in accordance with Section 607.2.1.

Exception: Sufficient emergency power shall be provided for not less than two elevators that only serves open parking levels of the high-rise building.

Section 607.2.4 Machine room ventilation is amended to read as follows:

607.2.4 Machine room ventilation. Where standby power is connected to elevators, the machine room ventilation or air conditioning shall be connected to the emergency or standby power source.

Section 607.3.1 Signage for existing elevators without a flashing hat indicator is added as follows:

607.3.1 Signage for existing elevators without a flashing hat indicator. Existing elevators with shunt trip capability that do not provide a flashing hat indication in accordance with Section 907.3.3.5 shall have an approved sign mounted adjacent to the FACP stating; “**CAUTION – Elevator is not equipped with “Flashing Fire Hat” capability. Elevator(s) could lose power if fire is detected in the elevator machine room or hoistway.**” Sign shall be black lettering on a yellow background.

Section 607.8 Exception is replaced in its entirety with the following:

Exception: The owner shall place the building’s existing, approved non-standardized fire service elevator keys in a key box complying with IFC Section 506.1.2.

Section 607.8.1 is amended by adding items 5 and 6 as follows:

5. Keys shall be Group 3 security in accordance with ASME A17.1.
6. All standardized fire service elevator keys located at the building shall be numbered sequentially by indelible marking and a key log shall be maintained on site that identifies the location and holder of each key. When a holder is no longer qualified to maintain possession of a key, the key shall be returned to the issuing authority for subsequent distribution in accordance with this code.

Section 607.8.1.1 New elevator installations is added as follows:

607.8.1.1 New elevator installations. Where a new elevator is installed as part of an existing group of elevators with a common controller, all elevators in the group shall be upgraded to the same firefighters’ emergency operation as required by this Code.

Section 607.8.1.2 Alterations to elevators is added as follows:

607.8.1.2 Alterations to elevators. Where an existing elevator is modified under any alteration encompassing a scope of work as described under Colorado Code of Regulations,

7 CCR 1101-8 or ASME A17.1 the altered elevator shall be provided with a standardized key. Where the altered elevator is part of an existing group of elevators with a common controller, all elevators in the group shall be retrofitted with a standardized key.

Exception: Elevators without existing Phase 1 and Phase 2 operation.

Section 607.8.1.3 Existing elevator installations is added as follows:

607.8.1.3 Existing elevator installations. Key switches required for Firefighters' Emergency Operation and Emergency or Standby Power Systems selection on all elevators within a building shall be retrofitted with the approved standardized key when required by the Fire Code Official.

Section 607.8.3 is replaced as follows:

607.8.3 Duplication or distribution of keys. No person may possess a standardized fire service elevator key unless in accordance with this code. Duplication of keys is not permitted. Unauthorized distribution/duplication of keys is subject to the penalties of Section 109.2.2.1.

Section 607.8.4 is replaced as follows:

607.8.4 Responsibility to provide keys. A key shall be provided for each switch installed. Standardized fire service access keys shall be maintained in an approved lock box within a secured fire command center in accordance with Section 508 where provided, or an approved, listed key box in accordance with IFC Section 506.

Section 607.9 Elevator recall for high-rise buildings with pressurized hoist ways is added as follows:

607.9 Elevator recall for high-rise buildings with pressurized hoistways. In addition to the requirements of ASME A17.1, Firefighters' service elevator operation within high-rise buildings with pressurized hoist ways shall be as follows:

1. The elevator doors shall automatically open when the car reaches the designated level. After a period of one minute, elevators shall automatically close their doors. The doors shall be responsive by pressing the designated return floor call button in the elevator lobby or by pressing the door open button in the interior of the elevator cab. Elevators shall remain at that level until manually overridden by the key-operated switch required by ASME A17.1.
2. Only the hall call buttons at the designated return level, the level the car(s) have returned to, shall function as door open buttons. All doors shall open simultaneously when operating under normal building power. When operating under emergency power, only the cars selected for emergency operation shall open their doors simultaneously.
3. During Phase 1 operation, the door recycle shall be 60 seconds.
4. Once the car is placed on Phase II, the fire department has control of the elevator; it shall operate in accordance with ASME A17.1, Section 2.27.3.3.

Section 607.10 Fire service access elevators is added:

607.10 Fire service access elevators. Installation of fire service access elevators shall comply with Section 919 and IBC Section 3007, as amended.

Section 607.11 Occupant evacuation elevators is added:

607.11 Occupant evacuation elevators. Installation of occupant evacuation elevators shall comply with Section 919 and IBC Section 3008, as amended.

SECTION 608
STATIONARY STORAGE BATTERY SYSTEMS

Section 608.5 Spill control and neutralization is replaced as follows:

608.5 Spill control and neutralization. An approved method and materials for the control and neutralization of a spill of electrolyte shall be provided in areas containing lead-acid, nickel-cadmium or other types of batteries with free-flowing liquid electrolyte. Each rack of batteries or groups of racks shall be provided with a liquid-tight 4-inch (101.6mm) minimum spill-control barrier, which extends at least 1-inch (25.4 mm) beyond the battery rack in all directions. For the purposes of this paragraph, a "spill" is defined as any unintentional release of electrolyte.

Exception: VRLA, lithium-ion or other types of sealed batteries with immobilized electrolyte shall not require spill control.

CHAPTER 8

INTERIOR FINISH, DECORATIVE MATERIALS AND FURNISHINGS

SECTION 806 **DECORATIVE VEGETATION IN NEW AND EXISTING BUILDINGS**

Section 806.6 Combustible natural vegetation is added as follows:

806.6 Combustible natural vegetation. Limited quantities of combustible natural vegetation shall be permitted in A, E, I3, R1, R2/Dormitory, and R-4 occupancies where the Fire Code Official determines adequate safeguards are provided based on the quantity and nature of the vegetation. Flame resistance shall be demonstrated in an approved manner for each item of vegetation. The use of unlisted electrical wiring and lighting on combustible natural vegetation is prohibited.

SECTION 807 **DECORATIVE MATERIALS OTHER THAN DECORATIVE VEGETATION IN NEW AND EXISTING BUILDINGS**

Section 807.5.2.2 Artwork in corridors is replaced as follows:

807.5.2.2 Artwork in corridors. Artwork and teaching materials shall be limited on walls of corridors to not more than thirty (30) percent of the area of each wall to which they are attached. The height from the floor to the ceiling multiplied by the length of the wall excluding door and window openings is considered the area of each wall. Artwork and teaching materials shall not be attached to any wall within eighteen (18) inches of the exit access door. Doors and windows, including view panels of interior exit access doors, shall not be covered. The use of crepe paper that is not listed as flame resistant is prohibited.

Exceptions:

1. These area limitations do not apply to artwork and teaching materials listed as non-combustible.
2. Artwork and teaching materials contained within fully enclosed, non-combustible or limited combustible containers or coverings such as metal and glass display cases are not required to be included in the area limitations.
3. Corridor walls may be used to attach artwork and teaching materials not to exceed sixty (60) percent of the area of each wall when the building is protected throughout by an automatic fire sprinkler system in accordance with IFC Section 903.3.1.1.

Section 807.5.2.3 Artwork in classrooms is replaced as follows:

807.5.2.3 Artwork in classrooms. Artwork and teaching materials shall be limited on walls of classrooms to not more than fifty (50) percent of the area of each wall to which they are attached. Artwork and teaching materials shall not be attached to any wall within eighteen (18) inches of the exit access door.

Exceptions:

1. Classroom walls may be used to attach artwork and teaching materials not to exceed eighty (80) percent of the area of each wall when the building is protected throughout by an automatic fire sprinkler system in accordance with IFC Section 903.3.1.1. The height from the floor to the ceiling multiplied by the length of the wall excluding door and window openings is considered the area of each wall.
2. These area limitations do not apply to artwork and teaching materials listed as non-combustible.

3. Artwork and teaching materials contained within fully enclosed, non-combustible or limited combustible containers or coverings such as metal and glass display cases are not required to be included in the area limitations.

Section 807.5.5.2 Artwork in corridors is replaced as follows:

807.5.5.2 Artwork in corridors. Artwork and teaching materials shall be limited on walls of corridors to not more than thirty (30) percent of the area of each wall to which they are attached. The height from the floor to the ceiling multiplied by the length of the wall excluding door and window openings is considered the area of each wall. Artwork and teaching materials shall not be attached to any wall within eighteen (18) inches of the exit access door. Doors and windows, including view panels of interior exit access doors, shall not be covered. The use of crepe paper that is not listed as flame resistant is prohibited.

Exception:

1. Corridor walls may be used to attach artwork and teaching materials not to exceed sixty (60) percent of the area of each wall when the building is protected throughout by an automatic fire sprinkler system in accordance with IFC Section 903.3.1.1.
2. These area limitations do not apply to artwork and teaching materials listed as non-combustible.
3. Artwork and teaching materials contained within fully enclosed, non-combustible or limited combustible containers or coverings such as metal and glass display cases are not required to be included in the area limitations.

Section 807.5.5.3 Artwork in classrooms is replaced as follows:

807.5.5.3 Artwork in classrooms. Artwork and teaching materials shall be limited on walls of classrooms to not more than fifty (50) percent of the area of each wall to which they are attached. Artwork and teaching materials shall not be attached to any wall within eighteen (18) inches of the exit access door.

Exceptions:

1. Classroom walls may be used to attach artwork and teaching materials not to exceed eighty (80) percent of the area of each wall when the building is protected throughout by an automatic fire sprinkler system in accordance with IFC Section 903.3.1.1. The height from the floor to the ceiling multiplied by the length of the wall excluding door and window openings is considered the area of each wall.
2. These area limitations do not apply to artwork and teaching materials listed as non-combustible.
3. Artwork and teaching materials contained within fully enclosed, non-combustible or limited combustible containers or coverings such as metal and glass display cases are not required to be included in the area limitations.

Section 807.6 Ceiling artwork and teaching materials is added as follows:

807.6 Ceiling artwork and teaching materials. Artwork and teaching materials suspended from classroom and corridor ceilings shall be in accordance with the following:

1. Where permitted by IFC Section 703.3, the ceiling structure must be capable of supporting the artwork and teaching materials.
2. The total area of materials suspended from ceilings plus the covered area of each adjacent wall shall not exceed the wall areas permitted to be covered in accordance with Sections 807.5.2.2, 807.5.2.3, 807.5.5.2 and 807.5.5.3.
3. Display of artwork and teaching materials shall not impair visibility or distract attention from any egress signage or alarm notification appliance.

4. No material shall be attached to electrified fixtures, electrical wiring, egress signage, plumbing, fire alarm components, fire sprinkler components, etc.
5. The display of artwork or teaching materials shall not obstruct or compromise in any manner the fire sprinkler or fire detection system.
6. Display of artwork and teaching materials on wires or cords strung across corridors from wall to wall shall not form a continuous combustible curtain. There shall be a minimum clearance of seven (7) feet from the floor to the lowest portion of the display.
7. Wires or cords used to suspend artwork and teaching materials from the ceiling cannot be strung from corner to corner of a room or space and cannot be strung parallel to any wall further than six (6) inches from the wall.

Exception: Where hanging or display of decorative materials is prohibited by IFC Section 703.3.

CHAPTER 9

FIRE PROTECTION SYSTEMS

SECTION

901

GENERAL

Section 901.2 Construction documents is amended by adding the following after the last sentence:

Shop drawings shall be provided in accordance with Appendix N.

Section 901.6.2 Records is replaced in its entirety with the following (subordinate Section 901.6.2.1 remains):

901.6.2 Records. Records of all system installations, inspections, tests and maintenance required by the Fire Code and referenced standards shall be maintained on the premises. Records shall be completed on National Fire Protection Association (NFPA) forms and/or forms provided by the Fire Marshal's Office. The name and contractor license number(s) of the person(s) performing the work shall be legible on all forms.

SECTION 902

DEFINITIONS

Section 902.1 Definitions is amended as follows:

902.1 Definitions. The following terms are defined in Chapter 2:

ALARM CONTROL

UNIT APPLIANCE

BATTERY

BACKUP

BATTERY-

POWERED

DEVICE

DUPLEX

FALSE FIRE

ALARM

HARDWIRED

INSTALLED

NON-DEDICATED SMOKE CONTROL SYSTEM

SINGLE-FAMILY DWELLING

SINGLE STATION [CO] ALARM

SLEEPING ROOM

SECTION 903

AUTOMATIC SPRINKLER SYSTEMS

Section 903.2.8.6 Townhouses is added as follows:

903.2.8.5 Townhouses. When two or more contiguous residential dwelling units constructed as townhouses, including those permitted under the IRC, are protected by a single, monitored sprinkler system, that system shall be configured so water flow is annunciated separately at the fire alarm control panel for each dwelling unit and each protected common area.

Section 903.2.9.1 Repair garages is amended by adding Items 5 and 6 as follows:

5. Repair garages with a spray booth and/or a mixing area greater than 16 square feet utilizing flammable finishes.

Exception: It is not necessary to install sprinklers throughout the entire building when replacing a previously approved booth with an approved packaged booth or one constructed in accordance with IFC Section 2404.3.2.

6. Repair garages using open flame or welding of any type where the garage floor area exceeds 3,000 square feet.

Section 903.2.9.2 Bulk storage of tires is replaced as follows:

903.2.9.2 Bulk storage of tires. Buildings and structures where the area for the storage of tires exceeds 2,500 cubic feet (566 m³) shall be equipped throughout with an automatic sprinkler system in accordance with IFC Section 903.3.1.1.

Section 903.2.11.7 Shafts in high-rise buildings is added as follows:

903.2.11.7 Shafts in high-rise buildings. Where a reduction in shaft construction fire rating is permitted by IBC Section 403, required sprinklers shall be located at the top of the shaft and at alternate floor levels. Sprinklers shall be provided with a dedicated riser with an isolation valve and flow and tamper switch. Activation of the flow switch shall communicate an alarm to the central station and activate vertical pressurization, but not occupant notification.

Section 903.3 Installation requirements is replaced as follows:

903.3 Installation requirements. All fire sprinkler systems and special extinguishing system design drawings shall be submitted in accordance with Appendix N.

Section 903.3.1.2 NFPA 13R sprinkler systems is replaced as follows:

903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in group R occupancies in buildings up to and including four stories in height measured above grade plane shall be permitted to be installed throughout in accordance with NFPA 13R.

Section 903.3.1.2.1 Balconies and decks is replaced as follows:

903.3.1.2.1 Balconies and decks. Sprinkler protection for balconies and decks shall comply with Section 903.2.8.5.

Section 903.3.3.1 Concealed spaces is added as follows:

903.3.3.1 Concealed spaces. Where concealed space sprinkler protection is required in accordance with Section 903.3 and insulation is installed on the underside of floor sheathing or roof sheathing, the insulation shall be secured into place with metal netting. Metal netting shall be not less than 20 gauge and mesh size not greater than 2 inches x 2 inches.

Section 903.3.5 Water supplies is replaced as follows:

903.3.5 Water supplies. The potable water supply shall be protected against backflow in accordance with IFC Section 912.6. Hydraulic calculations shall be based on water supply information provided by the City of Englewood Utilities Department. Water supply information provided shall be obtained within the last 12 months. Hydraulic calculations shall be based on the water data provided with static and residual pressures reduced by 10% of the static value or 10 psi, whichever is smaller. Where water supply data is provided by City of Englewood Utilities Department, the high static pressure shall be used to verify that the fire pump churn pressure shall be maintained below the system design pressure. Shop drawings shall indicate the initial pressures and the reduced values as used in the hydraulic calculations.

Exception: Sprinkler systems installed in accordance with IFC Section 903.3.1.3.

Section 903.3.5.1 Domestic service is replaced as follows:

903.3.5.1 Domestic service. Use of domestic service for water supply to automatic fire sprinklers shall be prohibited.

Exceptions:

1. Water supply for new NFPA 13D or IRC P2904 sprinkler systems.
2. UL-300 listed fire suppression systems in buildings that are not provided with automatic sprinklers.
3. Medical gas rooms in accordance with IFC Section 5306.

Section 903.3.5.2 Residential combination services is deleted.

Section 903.3.7 Fire department connections is deleted.

Section 903.3.8 Limited area sprinkler systems and all subsections through 903.3.8.5 are deleted in their entirety.

Section 903.3.9 Elevator hoist ways and machine rooms is added as follows:

903.3.9 Elevator hoist ways and machine rooms. In buildings protected with an automatic sprinkler system in accordance with NFPA 13 or NFPA 13R, elevator hoist ways and machine rooms shall only be provided with automatic sprinklers as described in NFPA 13, 8.15.5. Where sprinkler protection is provided, installation shall comply with NFPA 13 except as noted in this section. Hoist ways and machine rooms/spaces shall be protected by 286 degree F sprinklers. Coverage shall be designed for Ordinary Hazard Group One. Sprinklers shall be supplied from a separate, independent branch line with a readily accessible indicating shut-off valve located outside the hoistway or machine room. Control valves shall carry identification signs. Where sprinkler protection is not provided, automatic fire detectors shall be provided in accordance with Section 907.3.3.

903.3.9.1 Elevators undergoing alteration. Where an existing elevator is undergoing an alteration in accordance with *Colorado Code of Regulations*, 7CCR1101-8, fire protection and emergency operation shall be provided in accordance with this Section and IFC Section 607, as amended. In existing buildings with either a partial or complete fire sprinkler system and the elevator hoistway and/or the elevator machine room is not protected with sprinklers, the provisions of Section 903.3.9.1.1 or 903.3.9.1.2 shall apply. Installation of automatic sprinklers shall comply with Section 903.3.9.

903.3.9.1.1 Hydraulic Elevator. Protection of the elevator hoistway and machine room shall be provided as follows:

1. Smoke detectors shall be installed at all elevator lobbies and in the machine

- room(s) to provide recall.
- 2. Fire sprinklers (286F) and heat detectors (200 F) shall be installed within the elevator pit. Heat detector activation shall cause the hat indicator in the car to flash and initiate the required recall prior to operation of the sprinkler. Activation of a machine room smoke detector shall also cause the hat indicator within the car to flash.
- 3. In cars not equipped with a flashing hat indicator, signage shall be provided in accordance with Section 607.3.1. Activation of the heat detector within the elevator pit shall initiate recall.
- 4. Where an existing hoistway is equipped with a vent, the smoke detector at the top of the hoistway shall be maintained for vent operation. Activation of this smoke detector shall also initiate recall and cause the hat indicator in the car (where provided), to flash.

903.3.9.1.2 Traction Elevators. Protection of the elevator hoistway and machine room shall be provided as follows:

- 1. Smoke detectors shall be installed at all elevator lobbies and in the machine room(s) to provide recall.
- 2. A heat detector shall be installed at the top of the hoistway and within the machine room(s) to provide recall and cause the hat indicator in the car to flash.
- 3. In cars not equipped with a flashing hat indicator, signage shall be provided in accordance with Section 607.3.1. Installation of the heat detector at the top of hoistway is not required.
- 4. Where an existing hoistway is equipped with a vent, the smoke detector at the top of the hoistway shall be maintained for vent operation. Activation of this smoke detector shall also initiate recall and cause the hat indicator in the car (where provided), to flash.

Section 903.3.10 Sprinkler protection for electrical rooms is added as follows:

903.3.10 Sprinkler protection for electrical rooms In buildings required to be fully sprinklered, electrical rooms containing electrical switchboards, panel boards, distribution boards, control equipment, generators and/or transformers shall be protected with automatic sprinklers. Sprinkler protection shall be designed with high-temperature sprinklers. Only sprinkler branch lines protecting the electrical room are permitted in the room.

Exceptions:

- 1. The room or space is under the control of a public utility.
- 2. The room is dedicated to electrical distribution equipment, has equipment operating at 600 volts or more and is provided with a smoke detection system connected to a monitored fire alarm system.

Section 903.4.2 Alarms is replaced as follows:

903.4.2 Alarms. Approved audible/visible devices (24 VDC supervised) shall be connected to every automatic sprinkler system. These sprinkler water flow alarm devices shall be activated by main and/or zone water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Alarm devices shall be provided on the exterior of the building at least 10 feet above grade and within 25 feet of and visible from the fire department connections. Where a fire alarm system is installed, actuation of the automatic sprinkler system shall actuate the building fire alarm system.

Exception: One- and two-family dwelling units and townhomes constructed in accordance with the *International Residential Code*.

Section 903.4.2.1 Sprinkler monitoring panels is added as follows:

903.4.2.1 Sprinkler monitoring panels. Control panels installed for monitoring of sprinkler systems shall be located in accordance with Section 907.1.5.

Section 903.4.3 Floor control valves is replaced as follows:

903.4.3 Floor control valves. An approved floor control valve, check valve, drain valve, and flow switch for isolation, control, and annunciation shall be provided at each sprinklered level, including the topmost, of buildings:

1. Exceeding two stories in height with a total combined area of all levels exceeding the NFPA 13 system protection area limitations or;
2. Required to have standpipes in accordance with IFC Section 905 as amended.

SECTION 904

ALTERNATIVE AUTOMATIC FIRE-EXTINGUISHING SYSTEMS

Section 904.3.4.1 Visible notification is added as follows:

904.3.4.1 Visible notification shall be provided by yellow or amber strobes. Pending-discharge and discharge warning strobes shall be in conspicuous locations as approved by the Fire Code Official and activated by the agent releasing panel. Subject to the approval of the Fire Code Official, pending-discharge and discharge warning may be provided by combined audible/visible appliances. No more than two flash rates shall be possible in a single field of view in accordance with NFPA 72. Where pending-discharge and discharge warning strobes are provided in addition to visible fire alarm notification appliances, the warning strobes shall be synchronized, and fire alarm visible notification appliances shall be synchronized. A warning sign shall be provided that reads, "**WARNING – Fire Extinguishing Agent Release in Progress.**" Warning sign format, color and letter style shall be as approved by the fire code official.

Section 904.3.5 Monitoring is amended by adding the following at the end of the last sentence:

... "and Section 907."

Section 904.3.5.1 Releasing panel is added as follows:

904.3.5.1 Releasing panel. Pre-action and clean agent automatic fire-extinguishing systems shall be monitored and installed in accordance with this section and Section 907.6.7.

SECTION 905

STANDPIPE

SYSTEMS

Section 905.1 General is replaced as follows:

905.1 General. Standpipe systems shall be provided in new buildings and structures in accordance with this section. Fire hose threads used for connection to standpipe systems shall be approved and shall be compatible with Denver Fire Department hose threads – 2.5-inch hose thread is national standard; 1.5-inch hose thread is a special 11.5 threads per inch. The location of Fire Department hose connections shall be approved by the Fire Code Official. Where standpipe valve outlets are installed in stair enclosures, outlets and ancillary equipment (PRVs, drains, etc.) shall not reduce the required width of the stairway or landing.

905.1.1 Standpipe hose outlets. Each outlet shall have a cap and chain. Outlets shall be at least 36 inches and not more than 52 inches above finished floor. The valves shall have no less than 3 inches clearance around control valve and outlet cabinet shall not impede attachment of hose.

Section 905.2 Installation standard is replaced as follows:

905.2 Installation standard. Standpipe systems shall be installed in accordance with this section and NFPA 14. When water pressure at a standpipe outlet exceeds 175 psi static or residual at 250 gpm flow, a pressure-reducing valve shall be provided. The required pressure-reducing valves shall be located at the hose valve outlet only. Only field-adjustable valves shall be allowed. The valve shall have five (5) field-adjustable valve settings (A-E) on a color-coded indication label. Pin-in hex security screws shall be installed to secure the hand wheel and a high-impact plastic shield covering the pressure-reducing adjustment mechanism shall be provided. A pin-in hex bit shall be supplied with each valve. The pressure adjustment mechanism shall be actuated using an aluminum adjustment rod provided with each valve and actuated by rotating in either a clockwise or counter-clockwise direction. Pressure gauge taps shall be provided on inlet and discharge sides of each valve. A reflective decal shall be installed on the high-impact plastic shield valve with arrows and words indicating the direction to increase or decrease pressure. If special tools are required to make field adjustments, a minimum of four (4) such tools shall be provided at locations approved by the Fire Marshal.

Section 905.3.1 Height is amended by replacing the Exceptions as

follows: Exceptions:

1. Class I standpipes are allowed in buildings equipped throughout with an automatic sprinkler system in accordance with IFC Sections 903.3.1.1 or 903.3.1.2 subject to the provisions of IFC Section 913 as amended.
2. Class I automatic dry standpipes are allowed in single use or mixed-use open parking garages constructed in accordance with IBC Section 406.5, where the highest floor is located not more than seventy-five (75) feet above the lowest level of Fire Department vehicle access. In a mixed-use parking garage, the standpipe system serving the open parking garage shall be integrated with the fire protection system serving the other occupancies, and not be a stand-alone system. Hose connections shall be located as required for Class II standpipes in accordance with IFC Section 905.5.
3. Class I manual dry standpipes are allowed in single use open parking garages where the highest floor is less than 55 feet from the lowest level of Fire Department vehicle access. Hose connections shall be located as required for Class II standpipes in accordance with IFC Section 905.5. This provision is applicable to open parking garages with one level of underground enclosed parking garage.
4. Class I standpipes are allowed in basements equipped throughout with an automatic sprinkler system.
5. Intentionally deleted.

Section 905.3.4.1 Hose and cabinet is deleted.

Section 905.4 Location of Class I standpipe hose connections is amended by replacing Items 1 and 5 as follows:

1. In every required interior exit stairway, a hose connection shall be provided for each story above and below grade plane. Hose connections shall be located at an intermediate landing between stories, unless otherwise approved by the fire code official. Where exterior stairways are provided as part of the required exit stairway, hose connections shall be located at the floor landing or as otherwise approved by the Fire Code Official.

5. Where buildings have 4 or more stories above the grade plane and the roof slope is less than four units vertical to twelve units horizontal (33.3%) slope, there shall be at least two 2-1/2" roof manifold outlet connections above the roof line. Roof manifolds shall be located on the exterior perimeter of the stair enclosure within 20' of the roof access opening door.

Section 905.5.3 Class II system 1-inch hose is deleted in its entirety.

SECTION 906 PORTABLE FIRE EXTINGUISHERS

Section 906.1 Where required Item 1 and Exception are replaced as follows:

1. In new and existing Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies.

Exception: In Group R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 2-A:10-B:C.

Section 906.1 Where required is amended by adding Item 7 as follows:

7. Where required by Section 106 for townhouses, condominiums and apartments.

Section 906.2.2 Verification of service collars is added as follows:

906.2.2 Verification of service collars. Every portable fire extinguisher, regardless of type, shall have a verification of service collar, in accordance with NFPA 10. Only collars obtained from a licensed/certified fire extinguisher company are allowed. Collars shall not be cut.

SECTION 907 FIRE ALARM AND DETECTION SYSTEMS

Section 907.1.2 Fire alarm shop drawings is replaced as follows:

907.1.2 Fire alarm shop drawings. Shop drawings for fire alarm systems shall be submitted for permit application as a deferred submittal. Plan review and approval are required prior to issuance of a permit for system installation. Two sets of scaled, engineered installation shop drawings shall be submitted. Documents shall be of sufficient clarity and detail to fully describe the scope of work. Handwritten notes and comments on reproduced drawings are not acceptable. Submittals shall comply with Appendix N.

Section 907.1.3 Equipment is replaced as follows:

907.1.3 Equipment. Systems and their components shall be listed and approved for the purpose for which they are installed. Installation locations of all control panels and annunciators are subject to field approval by the Fire Marshal. Keys for all equipment required to be accessible to the Fire Department shall be maintained in an approved location in accordance with IFC Section 506. All components shall be compatible with the system in which installed.

Section 907.1.4 Connections to other systems is added as follows:

907.1.4 Connections to other systems. A fire alarm system shall not be used for any purpose other than fire warning or as specifically approved, e.g. pool alarm, access control release in accordance with, elevator recall and shunt trip, emergency alarms in accordance with Section 908, CO alarms in accordance with Section 915, hazardous materials alarms in accordance with Chapter 50, compressed gas alarms in accordance with Chapter 53 or mass notification

systems as approved by the Fire Code Official.

Section 907.1.5 Control units, annunciators and access keys is added as follows:

907.1.5 Control units, annunciators and access keys. All fire alarm control units and annunciators shall be UL 864 listed or equivalent. Locations shall be within 10' (3.048m) of the main building entrance, unless an alternate location is specifically approved. Equipment locations are subject to field approval prior to installation. Installation shall comply with NFPA 72. Access keys to locked fire alarm equipment shall be maintained in an approved location. Fire alarm control units shall not be equipped with a key or special numeric code to access system reset and silence functions. Access to the reset and silence operator interface shall be secured behind a locked door. Field modification of control units or annunciators is not permitted. System zone and device disable functions shall not be accessible without a maintenance-level access code. Alarm signals shall be protected from unauthorized deactivation. This applies to disconnection of the panel alarm transmission to the monitoring station and the alarm output circuit(s) to notification appliances. Deactivation shall only be allowed by Fire Department personnel or authorized entities responsible for system testing and maintenance. Any system deactivation shall be reported to the monitoring station and the Fire Department. Facilities whose systems are estimated to be deactivated for 10 hours or more shall be provided with an approved fire watch.

Exceptions:

1. In existing buildings undergoing a panel replacement, remote annunciators with silence and reset functions may be provided when approved by the Fire Code Official. These units shall not be equipped with "enable/disable" switches and shall be contained behind a transparent, lockable cover.
- 2 Low-power radio (wireless) systems shall comply with NFPA 72 and are permitted only for installations where the total system coverage does not exceed 1500 sf. Multiple low-power systems in a building are not permitted. Installation of low-power and wired systems is not permitted in the same building.

Section 907.1.6 Central alarm station connection is added as follows:

907.1.6 Central alarm station connection. All fire alarm and sprinkler protection systems required by this code or by special agreement shall be monitored by an approved Class I supervising station complying with Section 917. Multiple central alarm station connections from one building are not permitted. Alternatively, Fire Department radio boxes may be installed at locations approved by the Fire Marshal. Under no circumstances shall a radio box be removed from a protected premise without written approval of the Fire Code Official.

Section 907.1.7 Multiple fire alarm systems in a single building added as follows:

907.1.7 Multiple fire alarm systems in a single building. Only one fire alarm system shall be installed per building. Multiple points of silence and reset are prohibited on a single system.

Exceptions:

1. When permitted by the Fire Code Official, portions of a building separated by fire walls without openings and identified with separate legitimate addresses are allowed to be considered separate buildings. When protected by an automatic sprinkler system, each portion of the building so considered shall be protected by a separate independent sprinkler system or a portion of a single sprinkler system dedicated to the separated portion of the building.
2. Multiple points of silence and reset as allowed by Section 907.1.9 Exception.
3. Multiple buildings constructed over a common structure where approved by the

Section 907.1.8 Problematic systems is added as follows:

907.1.8 Problematic systems. Fire alarm systems that generate two (2) or more false or nuisance fire alarms within twenty-four (24) hours, three (3) or more within thirty (30) days, or ten

(10) or more within one year shall be immediately repaired, mitigated or replaced as necessary. A fine may be imposed for any false or nuisance fire alarms exceeding ten (10) within one year. A permit shall be obtained for all work. Fire protection, fire alarm and fire detection systems shall be properly maintained to provide at least the same level of reliability, performance and protection as designed and approved. The property owner shall be responsible for maintaining the system. If the system is found to be impaired two (2) or more times within a twelve (12) month period, legal action may be imposed until the system(s) is restored to a code complying condition.

Section 907.1.9 Systems out of service is added as follows:

907.1.9 Systems out of service. Systems undergoing maintenance or modification shall not have any portion of the system out of service for more than ten (10) hours. During maintenance or modification, all manual pull stations and notification appliances shall remain operational. Fire Watch must be provided in all areas of the building where maintenance or modification will place any portion of the system out of service.

Exception: Where practical difficulties are associated with replacement of fire alarm detection systems in existing high-rise buildings, phased replacement of an existing fire alarm system shall be permitted as follows:

1. An Administrative Modification (AM) request for the phased replacement of the fire alarm and detection system shall be submitted to the Fire Code Official for evaluation and approval prior to submission of shop drawings.
2. Two fire alarm control panels shall be allowed during the phased system upgrade. Existing and new fire alarm control panels shall be co-located at a location approved by the fire code official. During this period, it shall be acceptable to have two points of system reset via the two fire alarm control panels. A wall map showing each floor with descriptions of which system is controlling devices in each area shall be posted adjacent to the fire alarm control panels during construction. Upon completion of the new front end equipment installation and after all compatible devices have been transferred, tested and approved by the Fire Code Official, the contractor will remove the old panel and related equipment.
3. Installation within each floor shall be completed prior to commencement of work on any other floor unless the contractor can complete multiple floors simultaneously.
4. Project duration shall not exceed 24 months from the date the fire alarm permit is issued, nor shall the total duration, including project planning, design and installation, exceed 36 months. Subject to the approval of the fire code official, a single extension of up to a maximum of one year may be requested in writing. Extensions shall be granted only in cases of unforeseen difficulties. Building owners and contractors shall make every effort to minimize any delay to project completion.
5. The applicant shall present a planned schedule with phased replacement of the system and components, including scope of work and sequence of operation

- with coordination of the two fire alarm panels, to the Fire Code Official for review and approval prior to preparation of shop drawings.
6. Fire alarm and detection system protection shall be maintained at all times and in all areas, except where system/component replacement is taking place while installers are present. Existing and new devices and appliances not affected and outside of the installation area shall be maintained fully operational at all times.
 7. Phasing of fire alarm system replacement shall be in an organized, coherent and logical sequence to reduce system disruption and allow work while maintaining the life safety systems of the building.
 8. Audible and visual notification appliance coverage shall comply with NFPA 72 and this Code.
 9. Either point graphic annunciation or LED directory-type annunciation shall be provided. Where LED directory-type annunciation is provided, each device type per level in conjunction with progressive remote indicating lights for detected zones shall be provided. Where multiple smoke control zones are provided within each level, each compartment shall be separately annunciated. For existing buildings with graphic annunciation, either the graphic annunciation shall be maintained or replaced with a new graphic annunciation panel. Annunciator panels shall include LED lights for automatic detection, manual pull, flow, tamper, special systems, supervisory and trouble.
 10. Where the building has a smoke control system, detailed interface of the new fire alarm system with the existing or upgraded smoke control system shall be provided in the AM submission with details also shown on the shop drawings.
 11. The building owner or owner's representative and the design professional shall sign the AM request.
 12. The AM shall cite the practical difficulties of the proposed system replacement, the phased scope of replacement, the duration of each phase, as well as the total time from start to completion of the project. Failure to complete the project within the specified time frame shall subject the parties responsible to penalties specified in Section 109.

Section 907.2.1.3 Illumination of means of egress is added as follows:

907.2.1.3 Illumination of means of egress. Illumination levels shall comply with IFC Section 1008.2.1 and be interfaced to the fire alarm control unit as required.

Section 907.2.1.4 Smoke control is added as follows:

907.2.1.4 Smoke control. Where required by IBC Section 1029.6.2 for assembly areas with smoke-protected seating. Smoke detection shall be provided as required for smoke control operation in accordance with Section 909.17. The smoke control system shall be activated automatically by an alarm initiated from a smoke detector, heat detector or dedicated sprinkler water flow alarm within the smoke zone. No detector zone shall exceed 22,500 s.f. (2090.31 m²) or serve more than one smoke control zone. Where ceiling heights are 30 ft (7.62m) or greater, air sampling-type smoke detection systems or approved beam detection shall be provided in lieu of ceiling spot smoke detection.

Section 907.2.3 Group E is amended as follows:

907.2.3 Group E. Group E occupancies shall be provided with an approved manual fire alarm and automatic detection system throughout the occupancy. Emergency voice/alarm occupant notification shall be provided in accordance with IFC Section 907.5.2.2, as amended.

Exceptions 1 and 2 to remain.

Section 907.2.3 Group E Exception 3 is replaced as follows:

3. Manual fire alarm boxes and automatic detection are not required throughout Group E occupancies that are protected with automatic sprinklers throughout, where all the following conditions are met:
 - 3.1 Interior corridors are protected by smoke detectors.
 - 3.2 Manual fire alarm boxes are provided in the auditorium, cafeteria, gymnasium and staff locations.

Section 907.2.3 Group E Exception 4 is replaced as follows:

4. Conversion of existing buildings to a small day care and E occupancies with less than 20 occupants excluding staff that is provided with smoke alarms complying with NFPA 72 located throughout. Smoke alarms shall be interconnected and provided with a power source complying with Section 907.2.11.6. Smoke alarms with an integral strobe shall be provided in staff offices and teachers' lounge. Where battery operated smoke alarms are permitted, existing buildings shall be provided with battery operated smoke alarms with 10 year tamper proof lithium batteries.

Section 907.2.3.1 is added as follows:

907.2.3.1 Existing E occupancies. Where an existing Group E occupancy building undergoes an addition or alteration, an emergency voice/alarm communication system shall be provided throughout the new and existing Group E occupancy in accordance with IFC Section 907.5.2.2, as amended.

Exceptions:

1. Where the Group E area increase is less than 20% and locations of smoke detectors comply with the existing building coverage.
2. Where the building alteration or addition does not increase the aggregate occupant load of the Group E occupancy to 100 or more.

Section 907.2.6 Group I is amended by adding the following after the last sentence:

An emergency voice/alarm communication system in accordance with IFCA Section 907.5.2.2, as amended, shall be installed where partial evacuation is provided.

Exceptions 3 and 4 are added as follows:

3. A pre-signal system may be installed if approved by the Fire Code Official. Twenty-four hour personnel supervision is required at approved locations. Chimes may be installed in lieu of audible notification appliances as approved by the Fire Code Official. Fire Marshal's approval is required for pre-signal application or alarm verification.
4. Automatic fire detectors are not required in sprinklered areas less than 24 sq. ft. (2.23sq m.).

Sections 907.2.6.3.4 Zoning and annunciation and 907.2.6.3.5 Monitoring are added as follows:

907.2.6.3.4 Zoning and annunciation. Alarm, supervisory and trouble signals shall be displayed at the annunciation panel and be transmitted to the central alarm station.

Alarm signals shall indicate the type of alarm and the zone of origin, in accordance with NFPA

72. Separate zones shall be provided for individual fire protection systems, buildings, building levels, cell complexes and sections of floors constructed as smoke compartments.

907.2.6.3.5 Monitoring. The fire alarm system shall be monitored by an approved central alarm station service or by transmission of a local alarm which will give audible and visible signals at an approved constantly attended location.

Section 907.2.6.4 Group I-4 day care facilities is added as follows:

907.2.6.4 Group I-4 day care facilities. Day care occupancies shall be provided with an approved manual fire alarm and automatic detection system throughout the occupancy. Occupant notification shall be provided in accordance with IFC Section 907.5, as amended. Conversion of existing buildings to small day care centers shall comply with this section.

Exceptions:

1. If less than 50 occupants, the system is not required to be monitored by a central alarm station.
2. Where the occupant load is 20 or fewer manual fire alarm systems and automatic smoke detection systems are not required where 120v AC smoke alarms with battery back-up, wired to an un-switched source are provided.
3. Manual fire alarm boxes are not required throughout the building where all the following apply:
 - a. Interior corridors are protected by smoke detectors.
 - b. System central alarm station monitoring is provided.
 - c. Manual boxes are provided in locations supervised by staff in accordance with Item 4 below.
4. Where an approved automatic sprinkler system is installed throughout a Group I-4 day care occupancy, manual pull stations shall only be required in locations supervised by staff, (e.g. teachers' or nurses' lounge, custodial office, boiler room, administrative areas, auditorium and cafeteria). Notification appliances that activate on sprinkler water flow and/or activation of a pull station shall be provided throughout.

Section 907.2.11 Single- and multiple station-station smoke alarms is replaced as follows:

907.2.11 Single- and multiple station-station smoke alarms. Listed single- and multiple station-station smoke alarms complying with UL 217 shall be installed in accordance with IFC Sections 907.2.11.1 through 907.2.11.6, as amended, and NFPA 72, Chapter 29. As approved by the fire code official, smoke alarms may be connected to a fire alarm system for supervision only. Smoke alarms within dwelling and sleeping units shall be inspected and tested in accordance with NFPA 72, Chapter 14 and the manufacturer's instructions. A hard-copy log of all inspections, testing, maintenance and battery changes shall be kept at the property. This log shall include the dates of inspection, testing, maintenance and battery change and the person performing such. Upon request, a copy of the log shall be provided to the Fire Code Official. If this information is not current or available, an inspection shall be made to inspect and test all devices or the property owner or agent of the property owner shall be directed to retain a contractor licensed to inspect and test all devices and submit a report of the inspection findings to the Fire Code Official.

Exception: Residential occupancies regulated by the *International Residential Code*

shall comply with the applicable provisions of that code.

Section 907.2.11.2 Item 4 is added as follows:

4. Placement of combination smoke and carbon monoxide alarms in buildings containing dwelling units shall comply with Section 915.7

Section 907.2.13 High-rise buildings is replaced as follows:

907.2.13 High-rise buildings. High-rise buildings provided with a fire command center in accordance with Section 508, manual fire alarm boxes located in accordance with IFC Section 907.4.2 and an automatic fire alarm and detection system in accordance with IFC Section 907.2.13.1, as amended, a fire department communication system in accordance with Section 907.2.13.2, and an emergency voice/alarm communication system in accordance with IFC Section 907.5.2.2, as amended, that provides occupant notification of alarm on the fire floor, floor above, floor below and at the level of the Fire Command Center.

Exceptions 1-6 to remain.

Section 907.2.13.1. Automatic smoke detection is amended by adding items 3, 4, 5 and 6 as follows:

3. In all interior corridors serving as a means of egress for Group R-1, R-2 and R-4 occupancies, with an occupant load of 10 or more.
4. Not less than one foot but no more than three feet on the occupied side of each door that enters a refuge area, elevator lobby and exit stairway which does not directly exit from a refuge area, for occupancies other than R-1, R-2 and R-4.
5. At the top of stairwells and in elevator hoist ways (heat detectors in accordance with Section 907.3.3). These devices shall initiate an alarm condition and illuminate the respective indicator at the graphic annunciator. They shall not initiate occupant notification or the smoke control sequence.
6. Where unenclosed vertical openings are permitted by IBC Section 712, smoke detectors shall be located around the perimeter of the opening, on each level, not less than four feet from the edge of the opening. Unenclosed stairway and escalator openings shall comply with this Section and IBC 712.1.3. Two-story openings in other than I-2 and I-3 occupancies shall comply with IBC Section 712.1.9. See Section **907.2.14** for atriums.

Section 907.2.13.2 Fire department communication system is replaced as follows:

907.2.13.2 Fire department communication system. Two-way telephone communication services shall be connected to a UL 864 listed fire alarm system. Design of the fire department communications system shall consist of both of the following:

1. Hardwired components, in accordance with Section 907.2.13.2.1, consisting of permanent handsets, amplifiers and cable system for selective and "all-call" operation. Components shall be listed under UL product category code designation UOXX.
2. Radio communications using the emergency responder radio communications enhancement System (RES) in accordance with Section 510, designed and installed for full coverage in accordance with Section 510.1.1.

Section 907.2.13.2.1 Hardwired systems is added as follows:

907.2.13.2.1 Hardwired systems. A two-way, Fire Department communication system shall be provided for Fire Department use, each phone on the two-way Fire Department communication system shall have a separate control switch on the fire alarm control unit which distinctly identifies the location of the phone in use. The vertical riser and distribution wiring shall be installed in accordance with the *National Electrical Code* and shall comply with the pathway survivability requirements of NFPA 72, 24.5.

Section 907.2.13.2.1.1 Handsets is added as follows:

907.2.13.2.1.1 Handsets. Permanently mounted telephone handsets shall be provided. Each permanently mounted handset shall initiate a signal from the handset to the Fire Command Center. Permanently mounted telephone handsets shall be provided in the locations listed below:

1. Each mechanical room with fans used for smoke control
3. Emergency and standby power rooms
4. Each fire pump room
5. Each elevator equipment room

Section 907.2.13.3 Alarm notification is added as follows:

907.2.13.3 Alarm notification. Alarm notification in high-rise buildings shall comply with IFC Section 907.5, as amended, and notify occupants on the floor in alarm, the floor above, the floor below and at the level of the fire command center. Silence function shall be provided to independently silence notification appliances at the level of the Fire Command Center. This function shall be accomplished by an approved switch located in the Fire Command Center.

Section 907.2.13.4 Smoke control system activation is added as follows:

907.2.13.4 Smoke control system activation. Smoke control systems shall be automatically activated by alarm-initiating devices including return riser duct detectors, water flow switches, manual pull stations, and manual operation from the Fire Command Center (FCC), in accordance with Sections 907.2.13.4.1 and 907.2.13.4.2. After the initial alarm activation, any subsequent automatic alarm activation on another floor shall initiate the floor exhaust sequence in accordance with Section 907.2.13.4.2.

Exception: Main sprinkler system water flow, heat or smoke detectors located in stair or hoistway enclosures, kitchen hood suppression activation and sprinkler system water flow in building service chutes or shafts.

907.2.13.4.1 Activation of pressurization. Activation of stair and elevator hoistway enclosure pressurization shall be initiated by activation of any alarm-initiating device in accordance with Section 907.2.13.4 above.

907.2.13.4.2 Smoke control exhaust. Exhaust in a smoke control zone shall be automatically activated by any automatic fire alarm or sprinkler initiating device within the respective smoke control zone. Unless otherwise approved by the Fire Code Official, each floor of a high-rise building shall be considered a separate smoke control zone.

Exceptions: Kitchen hood suppression system activation.

Section 907.2.13.5 Annunciation is added as follows:

907.2.13.5 Annunciation. Graphic annunciation in accordance with Section

907.6.4.1.2 or computer graphic annunciation in accordance with Section 907.6.4.1.3 shall be provided.

Section 907.2.13.6 Elevator status/control panel is added as follows:

907.2.13.6 Elevator status/control panel. An elevator status/control panel shall be provided. The elevator status/control panel shall:

1. Identify each elevator cab alphanumerically and the floors it serves. Identify corresponding cab number in elevator cab.
2. Indicate elevator(s) that are operating on emergency power. Visual indicators in accordance with ASME A17.1 are required.
3. Have a placard at elevator status/control panel stating how many elevators can operate under emergency power simultaneously.
4. Indicate elevator car position.
5. Have key switches as required for selective activation of cars if all are not capable of simultaneous operation on secondary power.

Section 907.2.13.6.1 Fire service and occupant evacuation elevator status panels is added as follows:

907.2.13.6.1 Fire service and occupant evacuation elevator status panels. Status of designated fire service and occupant evacuation elevators shall be displayed on an approved standard emergency services interface in accordance with Section 919. These indications may be combined with the requirements of Section 907.2.13.6 as approved by the Fire Code Official.

Section 907.2.13.7 Emergency generator status panel is added as follows:

907.2.13.7 Emergency generator status panel. An emergency generator status panel shall be provided. The emergency generator panel shall show:

1. Operating status (on-off) and malfunction indication as required by NFPA 110
2. Indication of transfer switch position (normal-emergency)
3. Indication that generator is in automatic mode
4. Main fuel oil storage tank low fuel level alarm.

Section 907.2.13.8 Fire pump status panel is added as follows:

907.2.13.8 Fire pump status panel. A fire pump status panel shall be provided. The fire pump panel shall have:

1. Remote operating status indication as required by NFPA 20.
2. Motor/engine running/on or off. Pump running indication shall be transmitted to the fire alarm control panel as a supervisory signal and distinctly annunciated.
3. Low fuel level alarm for fire pump fuel tank.

Sections 907.2.20.1 Smoke detection in covered malls is added as follows:

907.2.20.1 Smoke detection in covered malls. Where covered malls require a smoke control system in accordance with IBC Section 402.7.2, smoke detection shall be provided

in accordance with Section 907.2.14.1.2.

Section 907.2.23 Battery rooms is amended by adding an Exception as follows:

Exception: A dedicated, detached on grade structure not to exceed 1,000 square feet.

Section 907.2.24 Airport buildings and structures is added as follows:

907.2.24 Airport buildings and structures. See NFPA 415.

Section 907.3.1 Duct smoke detectors is amended by replacing Exception 1 as follows:

1. Spot-type smoke detectors may be used for return air system connection to vertical risers serving two or more stories in accordance with NFPA 72. Detectors shall be listed for the maximum anticipated airflow velocity. Detectors concealed above the ceiling shall be provided with a remote indicating light mounted on the ceiling directly below the device. Remote indicating lights shall be installed in an accessible, visible area directly below or adjacent to the detector in accordance with Section 907.4.3.1.

Section 907.3.3 Elevator emergency operation is replaced as follows:

907.3.3 Elevator emergency operation. Automatic fire detectors installed for elevator emergency operation shall be installed in accordance with ASME A17.1 and NFPA 72. Where required, fixed temperature 190 degree F heat and smoke detectors shall be provided for shunt trip and recall operation. Where sprinklers are not provided in elevator hoistways in accordance with NFPA 13, 8.15.5, 135 degree F heat detectors shall be installed at the top of the hoistway for recall operation. Where elevator machinery is installed in a non-sprinklered hoistway, 135 degree F heat detectors shall be installed at the top of the hoistway for recall operation. Smoke detectors shall be installed in all machine rooms, control rooms and machine and control spaces. Where the pit of hydraulic elevators are not sprinklered in accordance with NFPA 13, 8.15.5.2, a 135 degree F heat detector shall be installed within 24" of the floor of the pit for the required recall operation. Where environmental or other conditions prohibit installation of smoke detectors for recall, 135 degree F fixed temperature heat detectors shall be permitted to substitute for the required recall smoke detectors. In buildings with a fire alarm system, these detectors shall be connected to the building fire alarm system.

Exceptions:

1. For existing buildings undergoing an elevator alteration, replacement or new installation, an administrative modification shall be submitted for approval where an existing complying fire alarm control unit cannot be expanded within its listing to accommodate required devices for recall and shunt trip. Upon approval by the Fire Code Official, a temporary "elevator recall and supervisory panel" shall be installed in accordance with the provisions of the Administrative Modification.. This panel shall report alarm and supervisory signals to the main FACP. The duration of a temporary elevator recall control and supervisory control unit installation shall not exceed 36 months from the date the temporary control unit permit is issued.
2. For existing buildings undergoing an elevator alteration, replacement or new installation, and not equipped with a required fire alarm system, a dedicated "elevator recall control and supervisory control unit" shall be provided. This panel shall be located in accordance with Section 907.1.5.

Sections 907.3.3.1 In buildings without a fire alarm system is added as follows:

907.3.3.1 In buildings without a fire alarm system, system smoke detectors and a dedicated fire alarm system control unit shall be provided that is designated as an “elevator recall control and supervisory panel.” The system shall be designed and installed in accordance with NFPA 72 and ASME A17.1.

Section 907.3.3.2 Where sprinklers are provided in elevator shafts and machine rooms, spaces or control rooms or spaces is added as follows:

907.3.3.2 Where sprinklers are provided in elevator shafts and machine rooms, spaces or control rooms or spaces, elevator power shunt trip shall be activated prior to sprinkler operation in accordance with NFPA 72.

Section 907.3.3.3 Shunt trip circuit breakers shall be located is added as follows:

907.3.3.3 Shunt trip circuit breakers shall be located in either the main power distribution room or installed in the elevator machinery room/space in a NEMA 3R enclosure.

Section 907.3.3.4 System smoke detectors shall be located in elevator lobbies, sprinklered hoist ways and machine/control rooms/spaces is added as follows:

907.3.3.4 System smoke detectors shall be located in elevator lobbies, sprinklered hoist ways and machine/control rooms/spaces. Activation of these smoke detectors shall return to level of exit discharge, nonstop, all elevators serving that lobby or with control equipment in the affected machine/control room/space except for the smoke detector in the elevator lobby at level of exit discharge which shall return the elevators to an alternate level. Elevators without a landing at level of exit discharge shall be returned to the landing that is closest to level of exit discharge or other approved level. The alternate level shall be approved by the fire code official. Elevators shall remain at the level where they returned, with doors open, until being manually overridden by the operator key switch required by ASME A17.1 or the elevator control panel in the Fire Command Center. Use of detector relay bases for recall activation is specifically prohibited.

Exception: Upon recall, elevators in pressurized hoist ways shall return to the designated or alternate level. Doors shall remain open for 60 seconds and then close.

Section 907.3.3.5 Elevator firefighter indicator is added as follows:

907.3.3.5 Elevator firefighter indicator. Section 2.27.3.2.6 of ASME A17.1/CSA B44-2013 is deleted as a reference. Operation of the elevator firefighter indicator shall comply with Section 907.3.3.5.1 or 907.3.3.5.2.

Section 907.3.3.5.1 New elevators is added as follows:

907.3.3.5.1 New elevators. When elevator recall is initiated by detection devices located in the elevator lobby, the firefighter indicator shall illuminate steady. Independent of the initiating device, when a detection device located in the elevator hoistway, machine room or other elevator control space activates, the firefighter indicator shall illuminate intermittently (flashing).

Section 907.3.3.5.2 Alterations to existing elevators is added as follows:

907.3.3.5.2 Alterations to existing elevators. Where an existing elevator is modified under any alteration encompassing a scope of work described under 7CCR 1101-8, the elevator firefighter indicator shall function in accordance with Section 907.3.3.5.1. This requirement applies when any alterations are made to the firefighter's emergency operation.

Section 907.4.3.1 Automatic Sprinkler System is renumbered to 907.4.3.2.

Section 907.4.3.1 Remote indicating lights is added as follows:

907.4.3.1 Remote indicating lights. A remote indicating light shall be installed for detector(s) within each room with an entry door. The indicating light shall be located on the wall or ceiling above the door and within 12 inches (30.48 cm), on the exit corridor side. This shall include each door leading through adjoining or intervening rooms from an exit corridor to that room (progressive type). Remote indicating lights shall be installed on the ceiling directly below detectors located above ceilings. Remote indicating lights shall latch "on" and remain lit (steady, or flashing at a minimum rate of one flash per second) until the fire alarm system is reset.

Exception: Remote indicating lights may be deleted where a point-lit or computer graphic annunciator is provided.

Section 907.5 Occupant notification systems is amended by adding Exceptions 2 and 3:

2. Smoke alarms in dwelling units and rooms used for sleeping purposes in R-1 occupancies. Duct detectors shall initiate a supervisory signal only.
3. Occupant notification shall not activate upon operation of detectors at the top of stairwells or in elevator hoist ways or main or service chute water flow devices.

Section 907.5.2 Alarm notification appliances is replaced as follows:

907.5.2 Alarm notification appliances. Audible and visible alarm notification shall be provided to alert occupants of the area having a fire alarm system as well as in the means of egress serving the occupancy. The fire alarm control panel shall incorporate an alarm silencing switch that shall only de-activate the audible notification appliances until the system is manually reset. Alarms shall be provided in accordance with IFC Sections 907.5.2.1, 907.5.2.2 and 907.5.2.3, as amended, and as required by other sections of this code. Notification appliances shall be listed for the purpose.

Section 907.5.2.1 Audible alarms is amended by adding the following after the last sentence:

In theaters, nightclubs, dance halls, ballrooms and similar areas, means shall be provided to reduce or eliminate background noise upon activation of the fire alarm system. Fire alarm audible notification shall comply with IFC Sections 907.5.2.1.1 and 907.5.2.1.2.

Section 907.5.2.1 Audible alarms Exception 1 is replaced as follows:

1. Alternate alarm notification shall be permitted in critical care areas of Group I-2 occupancies as approved by the fire code official.

Section 907.5.2.1.3 Low frequency alarms is added as follows:

907.5.2.1.3 Low frequency alarms. Low frequency alarm signal appliances shall be provided for general alarm notification to all sleeping units in accordance with NFPA 72, 18.4.5.3.

Section 907.5.2.2.3 Alternate uses is replaced as follows:

907.5.2.2.3 Alternate uses. The emergency voice/alarm communication system may be used for other emergency communication announcements with the approval of the Fire Code Official.

Section 907.5.2.2.6 Low frequency alarm signal is added as follows:

907.5.2.2.6 Low frequency alarm signal. A minimum of two cycles of an alert tone complying with NFPA 72, 18.4.5.3 shall precede and follow required voice evacuation messages.

Section 907.5.2.2.7 Background noise reduction is added as follows:

907.5.2.2.7 Background noise reduction. In very high noise areas, such as theaters, nightclubs, ballrooms and dance halls, the system shall be designed to reduce or eliminate the background noise upon alarm activation.

Section 907.5.2.3.2 Visible notification appliances in Groups I-1 and R-1 occupancies is replaced as follows:

907.5.2.3.2 Visible notification appliances in Groups R-1, R-2 and I-1 occupancies. Group R-1, R-2 and I-1 sleeping and dwelling units shall be provided with visible notification activated by an integral in-room smoke alarm required by Section 907.2.11. Visible notification appliances shall also be provided which are activated by the building fire alarm and/or automatic sprinkler system. The minimum number of sleeping units per building to be provided with visible notification appliances shall be in accordance with IFC Table 907.5.2.3.2. All accessible units required by IBC Table 1107.6.1.1 shall be provided with visible notification appliances as part of this requirement.

Section 907.6 Installation and monitoring is replaced as follows:

907.6 Installation and monitoring. A fire alarm system shall be installed and monitored in accordance with this section and NFPA 72.

Section 907.6.1 Wiring is replaced as follows:

907.6.1 Wiring. Fire alarm system and communications wiring shall comply with provisions of NFPA 72 and NFPA 70 (NEC) Article 760. Wiring color code shall be consistent throughout the entire system and permanently posted inside the fire alarm control panel. Separate colors shall be used for each type of initiating circuit, indicating circuit and control circuit. Color coding shall be by continuous colored insulation or by

application of six-inch (15.24 cm) long colored heat-shrink tubing at the end of each conductor at all splices, taps and terminations. Wiring shall not be painted. Wireless protection systems utilizing radio-frequency transmitting devices shall comply with the special requirements for supervision of low-power wireless systems in NFPA 72.

Section 907.6.1.1 Survivability is added as follows:

907.6.1.1 Survivability. Where occupant relocation or partial evacuation is part of the building life-safety plan, fire alarm system communication and other required emergency communication systems survivability shall be provided in accordance with NFPA 72 and this Section. Audible and visible notification appliance circuits, and firefighter two-way communications, shall be designed and installed such that attack by fire within an evacuation zone shall not impair control and operation of the system outside the evacuation signaling zone.

Exceptions:

1. Two way communication systems at elevator landings or elevator lobby area of rescue assistance as required by IFC Section 1009.8.
2. Notification appliance circuits shall not be routed through stairway enclosures except for the required appliances located in the stairway enclosure.

Section 907.6.1.1.1 System Design is added as follows:

907.6.1.1.1 System design. Where survivability is required, the systems wiring shall be designed to meet Pathway Survivability Level 3 in accordance with NFPA 72.

Exception: Stacked electrical closets that are separated from the remainder of the building by two hour fire-resistance rated fire barriers are permitted as a "protected area" for application of NFPA 72, 12.4.4(3). Where communication "risers" are routed horizontally because the rated rooms do not stack, the wiring shall be installed utilizing circuit integrity cable installed in conduit per UL FHIT.28 or routed in 2-HR fire resistance rated horizontal assemblies.

Section 907.6.1.2 Communication systems in existing buildings is added as follows:

907.6.1.2 Communication systems in existing buildings. Where occupant partial evacuation/relocation notification is provided and the existing communication systems comply with one of the performance design alternatives below, those systems shall be permitted to remain. The systems shall be maintained in accordance with the original design. Retrofit of existing systems are permitted to comply with the provisions of this section.

1. Separate "A" and "B" risers with alternating floor speakers, designed such that no more than ½ the speakers on a floor shall be affected by loss of any one amplifier, pre-amplifier or cable within the floor or communication zone.
2. Class A wiring configuration for risers and floor distribution provided system survivability is maintained in the event of a failure of any distributed or banked amplifier to limit the failure to no more than ½ the notification appliances on the floor plate in the notification zone. Internally backed-up amplifier modules are acceptable.
3. Class A wiring configuration for risers and class B floor distribution wiring with alternating speakers such that system survivability is maintained in the event of a failure of any distributed or banked amplifier to limit the failure to no more than ½ the notification appliances on the floor plate in the notification zone. Internally backed-up amplifier modules are acceptable.

Section 907.6.1.3 Monitoring integrity is added as follows:

907.6.1.3 Monitoring Integrity. Conductors and connections that interconnect equipment, devices and appliances shall be monitored for integrity, in accordance with NFPA 72, Chapter 12. Power supplies and in-building fire emergency voice/alarm communication systems shall be monitored for integrity in accordance with NFPA 72, Chapter 10.

Section 907.7.3 Zones is replaced as follows:

907.6.4 Zones. All fire alarm systems shall be divided into alarm zones. When two or more alarm zones are provided, visible zone indication shall be provided at an approved location. Zones shall comply with this section unless otherwise approved by the fire code official. Trouble and supervisory signals shall be indicated in accordance with this section and NFPA 72. Annunciator panels shall comply with Section

907.6.4.1. Annunciation zones shall comply with the following.

Each building level shall be annunciated separately as follows:

1. All manual devices.
2. All automatic devices.
3. Where standpipes are required in accordance with IFC Section 905, at each fire sprinkler water flow detection device. Sprinkler zones shall comply with NFPA 13.

Separate visible indication shall be provided for:

1. Main fire sprinkler flow. Individual risers in accordance with IFC Section 903.
2. Each special extinguishing system
3. Each non-required system
4. Each special detection system
5. Each stairway (where detection is provided)
6. Each emergency alarm system in accordance with Sections 908 and 915, and Chapters 50 and 53.
7. Each elevator hoistway and machine room (separate zone indication for smoke and heat detectors as provided)
8. System trouble
9. Sprinkler control valves (supervisory only). Maximum 20 devices per zone
10. Duct detectors (supervisory only). Maximum 20 devices per zone
11. Fire pump running supervisory indication
12. Elevator shunt trip power supervisory indication
13. Radio enhancement system power supervisory indication
14. Area of rescue assistance two-way communication supervisory indication
15. Radio enhancement system malfunction supervisory indication
16. Radio communicator trouble

Section 907.6.4.1 Annunciator panels is replaced as follows:

907.6.4.1 Annunciator panels. Annunciator panels shall be point-lit graphic or computer graphic or a directory LED point display type as approved by the Fire Code Official. Upon initiation of an alarm, supervisory or trouble condition, the panel shall record the status. Alarms shall "lock-in" until the fire alarm system is reset with a dedicated reset switch located at the main fire alarm control panel. Annunciation lights shall be red for "Alarm" and yellow for "Trouble" and "Supervisory" signals. Each signal type shall be distinctly identified.

Exception: Where a monitored building fire alarm control unit is not provided, annunciator panels are not required for a dedicated function elevator recall control and supervisory control unit or sprinkler water flow

and supervisory control unit.

907.6.4.1.1 Directory annunciator. A directory annunciator shall be provided as required. Location shall be field approved. The annunciator shall be provided with individual alarm indications in accordance with Section 907.6.4 for each zone. Indicators shall be of sufficient size and intensity to be visible in normal lighting.

907.6.4.1.1.1 Building plans. Scaled floor plans shall be permanently mounted adjacent to directory type annunciator panels. Plans shall be of durable construction, easily readable in normal lighting, protected by a smooth, transparent, plastic surface and shall include every building level including mezzanines and roofs. Plan content shall comply with Appendix N.

907.6.4.1.2 Point-lit graphic annunciator. A graphic annunciator shall be provided as required in Sections 907.6.4.1.2.1 through 907.6.4.1.2.3.

907.6.4.1.2.1 When required. A point-lit graphic annunciator is required for the following: underground buildings, high-rise buildings, buildings with a smoke control system in accordance with Section 909 and where required for a pre-action fire sprinkler or clean agent-extinguishing system in accordance with Section 907.6.7.

907.6.4.1.2.2 Location in building. Location of annunciators shall be field approved. Locations depicted on reviewed drawings are not permitted until field verification is secured.

907.6.4.1.2.3 Graphics. The annunciator shall consist of building plans in accordance with Appendix N, with the addition of discrete LED indications for each alarm and supervisory initiating device. The annunciator shall be provided with a momentary push-button "Lamp Test." Separate indications for "Trouble" and "Supervisory" conditions shall be provided.

Section 907.6.4.1.3 Computer graphic display is added as follows:

907.6.4.1.3 Computer graphic display. Computer graphic displays shall be permitted for individual system designs. Systems shall be fully compliant with UL 864. Systems shall contain a full color primary and secondary display. Demonstration of the specific equipment to be installed with the actual operating software for the proposed system shall be presented to the Fire Code Official. Operator interface to the graphic shall be based on:

1. Ease of use. Primary operator interface shall be standard 2-button mouse driven. Optional secondary interfaces may be provided.
2. Adequacy of display for operational purposes. Displays shall be capable of presenting the entire floor plate with all devices and device status shown on an initial alarm screen. On any alarm indication, the floor plate in alarm shall come up on the screen with all devices shown and the device in alarm highlighted. Display segmentation from this initial view shall be possible for expanding the view of the area of alarm incidence. Displays shall be contrasting black lines and lettering on a white background.
3. Flexibility of system for upgrade.
4. Minimal proprietary components. Accepts standard picture file types.
5. Plain English report generation of events, histories, maintenance schedules, device status and settings and user access.
6. UL-864 listed event-driven primary display. Secondary display(s) as approved by the fire code official. All displays shall be specified for 24-hour,

- 7-day continuous operation. A 3-year warranty is recommended.
7. Secure access.
 8. Fire alarm device icons shall be in accordance with NFPA 170 or graphic icons as approved by the Fire Code Official.

Building plans in accordance with Section 907.6.4.1.1.1 shall be provided and shall be located as approved by the Fire Code Official.

Section 907.6.7 Pre-action and clean agent extinguishing systems is added as follows:

907.6.7 Pre-action and clean agent extinguishing systems. Pre-action and clean agent extinguishing systems shall have a dedicated releasing panel and annunciator connected to the building fire alarm system where provided. Pre-action systems shall be installed in accordance with NFPA 13. Clean agent systems shall comply with IFC 904.10. Control panels shall be listed for releasing service. Control panel and annunciator shall be located outside the protected area in a location approved by the Fire Code Official. Areas protected by a single releasing panel shall be contiguous. Shop drawings for system installations shall be submitted in accordance with Appendix N, NFPA 13 and NFPA 2001. Cross-zoned detection systems shall transmit a building alarm on activation of the first initiating device. Fire protection piping and initiating device, control and annunciation drawings shall be submitted together. Clean agent systems are supplemental and not permitted to substitute for required automatic sprinkler systems unless specifically approved by the Fire Code Official.

Section 907.6.7.1 Annunciation is added as follows:

907.6.7.1 Annunciation. Pre-action and clean agent systems shall be provided with a local directory annunciator zoned for manual, smoke detector, flow alarm and tamper supervisory indications in accordance with Section 907.6.4.1.1. Systems with under floor and/or above ceiling detection devices shall be provided with a point-lit graphic annunciator in accordance with Section 907.6.4.1.2. Systems shall annunciate alarm and supervisory conditions at the main building fire alarm panel.

Section 907.6.7.2 Application of pre-action systems is added as follows:

907.6.7.2 Application of pre-action systems. The types of pre-action systems that are approved for use in accordance with NFPA 13 are: single interlock, non-interlock and double-interlock systems. Installation of double-interlock pre-action systems shall be subject to approval by the fire code official.

Section 907.10 Non-required full or partial systems is added as follows

907.10 Non-required full or partial systems. Fire alarm systems and fire detection systems not required in this Code or by special agreement are not required to be connected to a central station. Where non-required fire alarm and/or fire detection systems are connected to a central station, the central station shall be an approved Class I central station. Multiple central station connections from one building are not permitted unless approved by the fire code official. Installation of non-required full or partial fire alarm or fire detection systems shall comply with NFPA 72, Chapter 23. Zone annunciation shall be provided in accordance with Section 907.6.4. Annunciator and control panels for non-required or partial systems shall be of an approved type and have permanent signage indicating "Non-required System" or "Partial System." Partial and non-required systems shall be maintained operational. System removal shall be permitted only with

the approval of the Fire Code Official.

Exception: New and existing dwellings regulated by the *International Residential Code (IRC)*.

Section 907.10.1 General system design and installation requirements is added as follows:

907.10.1 General system design and installation requirements. Shop drawings must be submitted for approval. Documents shall be stamped and signed by a professional engineer licensed by the State of Colorado and shall comply with Section

907.1.2. Non-required systems installed in a building with a required fire alarm system shall have the non-required system connected to the required fire alarm control panel. Each non-required system shall annunciate as a separate zone at the required fire alarm control panel. Multiple fire alarm control panels are not allowed where a required system is installed.

Section 907.10.2 Design criteria is added as follows:

Design criteria. Design of non-required fire alarm systems shall comply with the following:

1. A minimum of one audible/visible alarm appliances per floor in an approved location.
2. One initiating device zone per floor.
3. Existing duct detectors are not required to be connected to a non-required system.
4. Secondary power is required for the FACP in accordance with NFPA 72.

Multiple non-required, non-monitored systems in a building are not required to be interconnected.

Section 908

Emergency Alarm Systems

Section 908.8 Emergency alarms is added as follows:

908.8 Emergency alarm systems. Emergency alarm systems shall be monitored by the building fire or sprinkler alarm control panel, where provided. An emergency alarm system shall be annunciated as a separate zone on the building annunciator and transmitted to the supervising station. Where multiple emergency alarm systems are installed, each shall be monitored and annunciated separately. Where the fire or sprinkler alarm control panel is not monitored by a supervising station, annunciation shall be provided in an approved location.

Subject to approval by the Fire Code Official, separate emergency alarm control panels monitored by the building fire or sprinkler alarm control panel, or emergency alarm panels installed in buildings without a fire or sprinkler alarm system are permitted. Where permitted, separate emergency alarm control panels shall be installed in approved locations outside of the potentially contaminated areas. Multiple separate emergency alarm control panels are permitted; however, areas protected by a single separate emergency alarm control panel shall be contiguous.

Floor plans of the area protected by an emergency alarm system shall be provided in accordance with the requirements of Section 907.6.4.1.1.1. If two or more zones are provided on an emergency alarm system, directory-style LED annunciation shall be provided at the emergency alarm control panel. Systems with under-floor or above-ceiling initiating devices shall be provided with a point-lit graphic annunciator in accordance with Section 907.6.4.1.2 at the emergency alarm control panel. Supervisory and trouble signals shall be annunciated separately with yellow LEDs and alarm signals shall be annunciated with red LEDs.

Manual emergency alarm initiating devices shall be annunciated on separate zones from automatic emergency alarm initiating devices. Automatic emergency alarm initiating devices required for different hazards shall be annunciated on separate zones for each hazard. Automatic emergency

alarm initiating devices for the same hazard located in separate rooms or areas, or separated by 100 feet or more in the same room or area shall be annunciated as separate zones.

Manual emergency alarm initiation shall be designed in accordance with this section and the manual fire alarm requirements of NFPA 72. Manual emergency alarm- initiating devices shall be yellow or amber, comply with the mounting requirements of IFC Section 907.4.2 and be installed outside of each interior exit and exit access door, and inside of each exterior exit and exit discharge directly serving the potentially contaminated area(s) identified in IFC Sections 908.1 through 908.7.

Audible and visible emergency alarm notification appliances shall be installed on the interior of the areas and visible notification appliances along with clearly legible signage shall be installed inside and outside of these occupancies in approved locations to alert all occupants possibly entering the potentially contaminated area.

Audible emergency alarm notification shall have tone and pattern distinctly different from fire alarm notification. Visible notification appliances shall be amber strobes or beacons. Subject to the approval of the Fire Code Official, complete notification in accordance with NFPA 72 throughout a building or facility beyond the potentially contaminated area is not required provided the potential for migration of the hazard to other occupied areas is small. Signage shall be placed adjacent to the amber strobes/horns. The sign shall have a minimum 2-inch block lettering with a minimum ½-inch stroke. The sign shall be on a contrasting surface of black on yellow and shall be of durable construction. Language shall be as approved by the Fire Code Official.

Section 908.8.1 Emergency alarm systems shop drawings is added as follows:

908.8.1 Emergency alarm systems shop drawings. Shop drawings for emergency alarm systems shall be submitted for permit application as a deferred submittal. Plan review and approval are required prior to issuance of a Fire permit for system installation. Two sets of scaled, engineered installation shop drawings shall be submitted. Documents shall be of sufficient clarity and detail to fully describe the scope of work. Handwritten notes and comments on reproduced drawings are not acceptable. Submittals shall comply with Appendix N.

1. This provision does not preclude application of the performance based design calculations.
2. Stairway and hoistway pressurization system designs in high rise buildings where the uppermost occupiable floor is more than 250 feet above the lowest level of fire department vehicle access, and all healthcare occupancy groups, shall be performed by an engineering analysis.

SECTION 910 SMOKE AND HEAT REMOVAL

Section 910.3.4 Smoke and heat vent fall protection is added as follows:

910.3.4 Smoke and heat vent fall protection. In Group F and S occupancies fall protection shall be provided meeting minimum requirements of Sections 910.3.4.1 and 1108 Items 1, 2 and 3.

Section 910.3.4.1 Fall protection construction is added as follows:

910.3.4.1 Fall protection construction. Fall protection shall be of such construction and mounting that they are capable of withstanding a load of at least 400 pounds applied perpendicularly at any one area on the screen. Covers shall be secured in place to prevent accidental removal or displacement. Openings limitation shall be not more than 6 inches in diameter or of slat work with openings not more than 2 inches wide with length unrestricted.

SECTION 912 FIRE DEPARTMENT CONNECTIONS

Section 912.2 Location is amended by replacing the last sentence with the following:

912.2 Location. With respect to hydrants, driveways, buildings and landscaping, fire department connections shall be so located that fire apparatus and hose connected to supply the system will not obstruct access to the buildings for other fire apparatus. The location of fire department connections shall be field approved by the fire code official prior to installation. Fire department connections shall be a minimum of one 2½ x 2½ x 4-inch Siamese or single 2½-inch, as approved by the fire code official. In buildings with standpipes, an FDC shall be located within 100 ft. of a fire hydrant.

Section 912.2.3 Orientation is added as follows:

912.2.3 Orientation. Fire department connections shall be oriented so inlets are in a horizontal line.

Exception: Two inlets may be stacked with written approval from the fire code official.

SECTION 913 FIRE PUMPS

Section 913.1 General is amended by adding the following after the last sentence:

913.1 General. Where provided, fire pumps shall be installed in accordance with this section and NFPA 20. Limited service controllers are not permitted. Access to fire pumps shall comply with Section 509.3.

Section 913.2 Protection against interruption of service is amended by adding the following after the last sentence.

913.2 Protection against interruption of service. The fire pump, driver and controller shall be protected in accordance with NFPA 20 against possible interruption of service through damage caused by explosion, fire, flood, earthquake, rodents, insects, windstorm, freezing, vandalism and other adverse conditions. Except as permitted by NFPA 20, rooms containing fire pumps shall be free of storage, equipment, and penetrations not essential to the operation of the pump and related components.

Section 913.2.2 Circuits supplying fire pumps is replaced as follows:

913.2.2 Circuits supplying fire pumps. Installation of cables used for survivability of fire pump circuits shall comply with NFPA 70 (NEC) Article 695. Cables shall be listed to UL 2196. Electrical circuit protective systems shall be installed in accordance with their listing requirements.

Section 913.4 Valve supervision is replaced as follows:

913.4 Valve supervision. Fire pump suction, discharge and bypass valves and isolation valves on the backflow prevention device or assembly shall be supervised by an approved central station complying with Section 917.

Section 913.4.1 Test outlet valve supervision is replaced as follows:

913.4.1 Test outlet valve. The hose control valves for the fire pump test outlet(s) shall be located on the exterior of the building. The main supply valve controlling the fire pump test outlet(s) shall be supervised in the closed position.

Section 913.6 is added as follows:

913.6 Fire pump requirement for non-high-rise buildings. Where Class 1 manual wet standpipes are required by other provisions of this code, augmentation of the standpipe system by the Fire Department shall comply with Section 913.6.1.

Section 913.6.1 System supply is added as follows:

913.6.1 System supply. Minimum flow rate for the hydraulically most remote standpipe shall be 500 gpm, and the calculation procedure shall be in accordance with NFPA 14. The minimum flow rate for additional standpipes shall be 250 gpm per standpipe, with the total not to exceed 1,000 gpm for buildings that are sprinklered throughout in accordance with NFPA 13 or NFPA 13R. Minimum pressure for system design shall be as required by NFPA 14 with Fire Department pumpers supplying the system with a maximum flow rate of 1,000 gpm and a maximum pressure of 150 psi at the fire department connection (FDC).

Section 913.7 Remote status panel is added as follows:

913.7 Remote status panel. Where the fire pump room is not constantly attended, a fire pump remote operating status panel shall be provided in accordance with NFPA 20. The fire pump remote operating status panel shall be located adjacent to the fire alarm control panel or as determined by the Fire Code Official.

Section 913.8 Diesel engine pump drivers is added as follows:

913.8 Diesel engine pump drivers. Diesel drivers for fire pumps shall comply with NFPA 20. A dedicated fuel supply shall be provided sufficient for eight (8) hours of operation. Fill openings shall be located on the exterior of the building with an approved fill port. If fuel pumping is required from a main fuel tank to a diesel engine pump driver, a duplex pumping system shall be provided.

Section 916 Emergency Responder Radio Enhancement System (RES) is added as follows:

SECTION 916

EMERGENCY RESPONDER RADIO ENHANCEMENT SYSTEM (RES)

916.1 Where required. Buildings shall have approved radio coverage in accordance with Section 510 for emergency responders as follows:

1. High-rise buildings
2. Underground buildings (constructed in accordance with IBC Section 405)
3. Airport buildings and structures
4. In accordance with Section 916.1.1

916.1.1 Compliance testing. New buildings of 50,000 gsf or more and all new Group E and I occupancies over 10,000 gsf on any story shall be tested upon substantial construction completion and where lacking required coverage, shall be provided with an RES. Buildings having compliant initial radio coverage shall be tested every five years thereafter in accordance with Section 510.2.1.1 for continued adequacy of emergency responder radio communications coverage. Buildings failing to meet the minimum coverage requirements after testing shall be provided with an RES in accordance with Section 510. Where it is determined

by the Fire Code Official the radio coverage system is not needed, written documentation of the adequacy of existing radio coverage shall be maintained on site.

916.1.2 Emergency responder radio coverage in existing buildings. For existing high-rise, underground buildings, I-1, I-2 and I-3 occupancies and airport buildings, when undergoing an upgrade to install a Mass Notification System (MNS) or complete fire alarm head-end equipment replacement, the building shall be tested to Section 510 for public safety radio coverage and where deficient, RES coverage shall be provided. Buildings with currently acceptable signal strength shall be retested at five- year intervals in accordance with Section 510.2.1.1 to ensure continued compliant radio coverage. Where it is determined by the Fire Code Official the radio coverage system is not needed, written documentation of the adequacy of existing radio coverage shall be maintained on site.

Section 917 Central Alarm Stations is added as follows:

SECTION 917 CENTRAL ALARM STATIONS

917.1 General. Where required by Section 907.1.6, monitored protected premises systems shall be connected to an approved central alarm station. A Class I central alarm station shall comply with this section. Signals shall be transmitted, received and managed in accordance with NFPA 72. Approved central alarm stations shall be listed to UL 827 and as approved by the fire code official. All central alarm stations shall obtain an annual operating license from the Fire Department and meet the facility construction and operational requirements of NFPA 72. Central alarm stations shall be subject to Fire Department inspection during normal business hours. Installations found not to maintain facility requirements and/or operating procedures in accordance with NFPA 72 or the certificated listing, shall be subject to license revocation by the Fire Department.

Exception: Approved protected premises connected directly to Denver Fire Department Dispatch.

917.2 Communication methods. Communication from a protected premises to a central alarm station shall be by digital alarm communicator transmitter (DACT), two-way RF multiplex system or one-way private radio alarm system in accordance with NFPA 72. Alternative performance-based communication technologies may be presented for consideration by the Fire Code Official for application in the jurisdiction. Performance-based systems shall be submitted for approval under Section 104. Provisions of Section 104 for technical assistance, may be required at the discretion of the Fire Code Official, for determination of the adequacy of the proposed technology to the requirements of NFPA 72 and this code. Fees for department evaluation of performance-based systems shall apply in accordance with the Building Department fee schedule for "Application for consideration of Alternate Materials, Methods, or Equipment.

917.3 Transmission channels. Transmission channels between a protected premises and central alarm stations shall consist of one of the methods of Sections 917.3.1, 917.3.2, 917.3.3 or as approved in accordance with Section 917.2 for performance-based technologies. Transmission channels shall be monitored for integrity in accordance with NFPA 72.

917.3.1 DACT transmission shall consist of a minimum of one seizable public phone line and an approved NFPA 72 Type 4 or Type 5 two-way RF multiplex system, with a network connectivity (Net/Con) of 6 or less, ~~or~~ a minimum one-way private radio alarm system complying with Section 917.3.3 or an approved alternative communication technology in accordance with Section 917.2.

917.3.2 RF multiplex systems shall consist of sufficient UL-listed fire system transmitter/receivers to establish and maintain a minimum Net/Con of 5 or less as measured by manufacturer-approved test equipment. Primary RF multiplex systems shall meet NFPA 72 requirements for a Type 4 network. RF systems that cannot achieve this required level of

reliability shall only be permitted as a secondary communication means in accordance with Section 917.3.1. RF communications of fire alarm signals shall only be permitted over a network dedicated to and listed for transmission and receipt of fire alarm signals. Upon application for a system installation permit for any subscriber unit, the central station licensee shall provide documentation verifying that their network complies with the requirements for a listed, dedicated fire alarm signal network for the protected premises.

917.3.3 One-way private radio alarm systems shall consist of a network of radio alarm supervising station receivers, radio alarm repeating station receivers and radio alarm transmitters. The system shall be configured for Type 6 or Type 7 operation in accordance with NFPA 72. Radio communications of fire alarm signals shall only be permitted over a network dedicated to and listed for transmission and receipt of fire alarm signals. Upon application for a system installation permit for any subscriber unit, the central station licensee shall provide documentation verifying that their network complies with the requirements for a listed, dedicated fire alarm signal network for the protected premises. Signal quality shall be supervised and maintained in accordance with NFPA 72.

Section 918 Transmission of City Microwave Signals is added as follows:

**SECTION 918
TRANSMISSION OF CITY MICROWAVE SIGNALS**

918.1 General. Construction permits or Certificates of Occupancy shall not be issued for any building or structure exceeding 60 feet (18.3m) in height which interferes or may interfere with the transmission or reception of City microwave communication signals unless the owner of the building or structure provides for installation of equipment to retransmit or redirect the signal as necessary to eliminate any interference. Such equipment shall be approved by and installed at the direction of the Fire Marshal. A service agreement must also be approved where transmission is affected by the proposed building or structure prior to the issuance of any permit or Certificate of Occupancy. Such agreements shall include provisions for easements and access for maintenance, electricity for operation, and replacement of equipment.

Section 919 Elevators and Conveying Systems is added as follows:

**SECTION 919
ELEVATORS AND CONVEYING SYSTEMS**

919.1 General. Elevators and other conveyances shall comply with this code, codes and standards as referenced in Chapter 80, Colorado State Regulation 7CCR 1101-8 and the applicable equipment installation and maintenance standards.

919.2 New installations. Installation shop drawings shall be submitted for approval prior to installation of any conveyance. Conveyances shall be registered with the State of Colorado Division of Oil and Public Safety before issuance of any installation permit. Shop drawing submittal shall comply with this section and Appx N. Colorado State registration is not required for residential conveyances and temporary construction elevators.

919.3 Alterations to existing conveyances. Alterations to existing conveyances as defined in Colorado Code of Regulations 7CCR1101-8 shall require submittal of shop drawings for approval in accordance with Section 919.2. Conveyances shall have a valid Colorado State registration number prior to approval of any alterations. Colorado State registration is not required for residential conveyances and temporary construction elevators.

919.4 Removal from service. Permits shall be obtained from the Fire Marshal prior to any conveyance being removed from service, made dormant or otherwise rendered inoperable.

919.5 Annual operating permit. All conveyances shall obtain an annual conveyance operating permit prior to issuance of a Certificate of Operation. No conveyance shall be operated without a valid Certificate of Operation.

Exceptions:

1. Conveyances issued a Temporary Certificate of Operation when operating under the terms of that Certificate.
2. Residential elevators complying with Section 919.21

919.6 Standardized key switches. All elevators shall be provided with standardized key switches for emergency operation in accordance with Section 607.8.1.

919.7 Venting of hydraulic tanks located in hoist ways. New and existing elevators permitted to have a hydraulic tank located in the hoistway in accordance with ASME A17.1 shall be provided with tank venting.

919.8 Emergency and standby power. Where emergency or standby power is provided to elevators or other conveyances as required by this code, the *International Building Code*, other applicable standards or voluntarily, installation and operation shall comply with IFC Sections 604 and 607, as amended.

Exception: Where emergency or standby power is required for platform lifts as part of an accessible means of egress in accordance with IFC Section 1009.5, battery-powered units are acceptable where the battery capacity meets the requirements of ASME A18.1. Battery-powered units shall be provided directly by the platform lift manufacturer in accordance with the equipment listing.

919.8.1. Auxiliary power lowering operation provided in accordance with ASME A17.1 shall be permitted and shall not be considered as an emergency or standby power source.

919.9 Fire service access elevators. Where required by the *International Building Code*, fire service access elevators shall be provided. Elevator system monitoring, electrical power, sprinkler protection, protection of wiring or cables and standpipe hose connection access shall comply with IBC Section 3007. Elevator monitoring panels shall be submitted for approval prior to installation and shall monitor and display the conditions in accordance with NFPA 72, 21.5.1. Occupancy of elevator cars shall be continuously monitored by CCTV or other means approved by the Fire Code Official. Shunt trip operation shall not be permitted for fire service access elevators.

919.10 Occupant evacuation elevators. Where required by the *International Building Code*, occupant evacuation elevators shall be provided. Elevator system monitoring, elevator recall, electrical power, sprinkler protection, two-way communication, protection of wiring or cables, emergency voice/alarm communication and notification appliances shall comply with IBC Section 3008. Elevator monitoring panels shall be submitted for approval prior to installation and shall monitor and display the conditions in accordance with NFPA 72, 21.6.1. Occupancy of elevator cars shall be continuously monitored by CCTV or other means approved by the fire code official. Shunt trip operation shall not be permitted for occupant evacuation elevators.

919.11 Elevators with destination dispatch. Where elevators with destination dispatch are provided, they shall be provided with a common Phase I recall key switch and indicator located in the lobby within sight of the elevator or all elevators in that group and shall be readily accessible.

919.12 "TWIN" type elevators. Installation of "TWIN" elevators shall be as approved by the State of Colorado Division of Oil and Public Safety and the fire code official.

919.13 Elevator firefighter indicator. The operation of the elevator firefighter indicator (firefighter hat symbol) shall comply with Section 907.3.3.5.

919.14 Elevator in-car communications. Where required by ASME A17.1, two-way in-car communications shall be provided from the car to an approved location. Authorized personnel at

the receiving station shall notify the Denver Fire Department in accordance with Section 401.3.2 of any indication of a trapped party medical emergency or non-responsive occupant or presence of smoke or fire. Communication from the elevator car to an off-site monitoring station shall be by a loop-start seizable phone line.

919.15 Elevator building communications for elevator rise of 60 feet (18.5m) or more. Where required by ASME A17.1, two-way communications shall be provided for emergency personnel to communicate directly with occupants of the elevator car. Communications equipment for emergency responder use shall be located in the Fire Command Center, where provided, or adjacent to the fire alarm control unit. Where elevators within a building are required to comply with this section, these elevators shall be identified at the emergency responder communication means.

919.16 Inspections. Elevator and conveyance annual and periodic inspections shall comply with 7CCR 1101-8, manufacturer's instructions, the Maintenance Control Plan and this code.

919.17 Alterations to elevator car dimensions and/or hoistway openings. Alterations to dimensions of existing elevator cars and hoistway openings is subject to approval by the fire code official. Alterations to dimensions of elevator cars and/or hoistway openings shall not be permitted unless such alterations meet the requirements for a new installation.

919.18 Conveying systems. Escalators, moving walks, conveyors, platform lifts, dumbwaiters, stairway chair lifts, personnel hoists, material lifts and material hoists shall comply with the provisions of this code and Chapter 30 of the *International Building Code*.

919.19 Automated Guideway Transportation Systems (AGTS). AGTS shall comply with Sections 919.2, 919.3 and ASME 21 as adopted by the State of Colorado.

919.20 Conveyances used during construction. Elevators and personnel hoists used during construction shall comply with ASME A17.1 Section 5.10, ANSI A10.4 and DFD Policy105-4. Upon installation or modification, certification shall be provided to the Fire Marshal that the required acceptance test was performed in accordance with the approved plans, ANSI A10.4 and the manufacturer's installation instructions. Such certification shall also be provided for each periodic inspection required at intervals not to exceed 90 days. Certifications shall bear the signature and license number of a licensed inspector.

919.21 Residential elevators. All elevators used in private residences shall comply with ASME A17.1 Section 5.3. Installation or alteration of an elevator in a private residence shall be submitted for approval in accordance with Section 919.2 or Section 919.3.

919.21.1 Certificate of operation. Residential elevators are required to have a current Certificate of Operation issued by a licensed elevator inspector. Certificates shall be valid for a period of three years and shall require submission to the Fire Marshal as an inspection affidavit signed by a licensed inspector prior to issuance or renewal.

CHAPTER 10

MEANS OF EGRESS

Section 1009.8.1 System requirements is replaced in its entirety with the following:

1009.8.1 System requirements. A two-way communication system shall provide two-way voice communication and visual annunciation between call boxes at locations required by IBC/IFC Section 1009.8 and a master control station. Call boxes provided in addition to those in required locations shall comply with this Section.

The master control station shall be installed in the Fire Command Center (FCC) where provided. In a building where an FCC is not provided, or where multiple master control stations are proposed, locations shall be as approved by the Fire Code Official. In buildings with multiple master control stations, required features and functionality shall be provided simultaneously at all of them. In this configuration, the Fire Code Official shall designate the overriding master control station that supersedes all additional master control stations and assumes any telephone connection established with a monitoring location or 911.

A call from a call box shall be directed to the master control station. When the master control station is not constantly attended, the call shall be redirected automatically within 30 seconds to an approved monitoring location. The call shall be redirected to 911 if the building does not have an approved monitoring location or if no one at the monitoring location is capable of answering the call and taking appropriate action. The call shall not be transmitted to an automated answering system. Two-way voice communication shall be established between the call box and a person at the monitoring location capable of taking appropriate action, or 911. Two-way voice communication shall be discontinued only when monitoring-location personnel or emergency personnel terminate the call.

The two-way communication system shall be connected to a source of standby power capable of providing the required functionality for a minimum of four hours when the normal power supply fails. The two-way communication system shall be monitored for integrity and annunciated in accordance with NFPA 72, 10.19.2

The following features shall be provided at the call boxes:

1. The controls shall be accessible and usable by people with disabilities. Clearance, location, protrusion, labeling, signage, and operability of the equipment and user interface shall comply with ANSI A117.1.
2. A push button to activate two-way communication shall be provided.
3. An ANSI A117.1-compliant protective cover shall be provided over the face of the call box, including the button. The cover shall be openable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. Upon releasing the cover from its closed position, it shall hold itself in the open position so as to provide clear access to activate the button with the same hand. The maximum force required to activate operable parts shall not exceed 5 lbs. (22.2 N). In the open position, the cover shall not encroach on reach ranges required by ANSI A117.1. When the cover is in the open position, the button shall be clearly visible.
4. **“EMERGENCY EVACUATION ASSISTANCE”** shall be permanently identified on the protective cover in blue lettering with white contrast or white lettering with blue contrast. The lettering shall be clearly visible, 5/8" (16mm) minimum height, and ANSI A117.1-compliant.

5. When the button is pushed, the two-way communication system shall initiate a call for assistance at the master control station. A visual indication shall be provided on or adjacent to the button, and an audible signal shall be provided to acknowledge successful initiation
6. After the acknowledgement signals are sent, two-way communication shall be established without any intentional delay or required intervention by the person initiating the call. Audible and visual indications shall be provided on the call box to acknowledge two-way voice communication has been established. Visual indication shall be deactivated only when the two-way voice communication is terminated.

The following features shall be provided at the master station(s):

1. Identification of the master control station as the emergency evacuation system master control station;
2. Text operating instruction on the use of the systems;
3. The ability to receive and answer calls from all call boxes in the building served by the master control station;
4. The ability to identify the specific location (story and room) of every call box actively engaged in a call with the master control station;
5. The ability to initiate a call to a call box;
6. The ability to simultaneously put multiple calls on hold without terminating any.

Section 1009.8.3 Problematic systems is added as follows:

1009.8.3 Problematic systems. Existing two-way communication systems shall be modified to comply with IBC/IFC Section 1009.8.1 when two (2) or more nuisance calls are placed within a twenty-four (24) hour period, three (3) or more within a thirty (30) day period, or ten (10) or more within a twelve (12) month period. In addition a fine is permitted to be imposed in all cases where the number of nuisance calls exceeds ten (10) within a twelve (12) month period.

The property owner shall be responsible for maintaining the two-way communication systems required by this code to provide, at a minimum, the level of reliability and performance as required when originally permitted. Malfunctioning two-way communication systems shall be immediately repaired or replaced. Legal action is permitted to be imposed for two-way communication systems found to be malfunctioning. Permits shall be obtained in accordance with IFC Section 105 for all work on two-way communication systems required by this code.

SECTION 1018 AISLES

Section 1018.5 Aisles in other than assembly spaces and groups B and M is amended by adding Exception 2.

Exceptions:

2. Aisles in high-piled combustible storage areas shall comply with the applicable provisions of Chapter 32 of the *International Fire Code*, as amended.

CHAPTER 11

CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

SECTION 1101 GENERAL

Section 1101.2 Intent is replaced as follows:

1101.2 Intent. The intent of this chapter is to provide a minimum degree of fire and life safety to persons occupying existing buildings by providing minimum construction requirements when the applicable requirements for such buildings cannot be ascertained by one or more of the following:

1. The building and fire codes in effect when the building was reviewed and permitted for construction.
2. The building and fire codes in effect when the building was last certified for occupancy
3. All applicable retrofit ordinances, including retroactive regulations contained elsewhere in this Code.
4. Modification under IBC Section 106 Alternate Materials, Design and Methods of Construction and Equipment.
5. Subject to approval by the fire code official, existing life safety features that exceed the requirements for new buildings shall be permitted to be decreased to those required for new buildings.
6. Existing life safety features that do not meet the requirements for new buildings, but that exceed the requirements for existing buildings, shall not be further diminished.

Exception: Existing buildings shall comply with the requirements of IFC Sections 1103.2, 1103.3, 1103.7.5, 1103.9, 1107, and 1108, as amended.

SECTION 1103 FIRE SAFETY REQUIREMENTS FOR EXISTING BUILDINGS

Section 1103.1 Required construction is amended by adding Exception 3 as follows:

3. See Section 3211 for requirements for existing buildings constructed **prior to October 1990** and used for high-piled or rack storage.

Section 1103.2 Emergency responder radio coverage in existing buildings is replaced as follows:

1103.2 Emergency responder radio coverage in existing buildings. See Section 916.1.2.

Section 1103.3.1 Elevators, escalators and moving walks is replaced as follows:

1103.3.1 Elevators, escalators and moving walks. Existing elevators, escalators and moving walks in Group I-2 Condition 2 occupancies shall comply with *Colorado State Regulations*, as amended from time to time.

Section 1103.3.2 Elevator emergency operation is replaced as follows:

1103.3.2 Elevator emergency operation. Existing elevators with a travel distance of 25 feet (7620 mm) or more above or below the main floor or other level of a building and intended to serve the needs of emergency personnel for fire-fighting or rescue purposes shall be provided with

emergency operation in accordance with *Colorado State Regulations*, as amended from time to time.

Exceptions 1 and 2 to remain; Exception 3 is amended as follows:

3. Freight elevators in buildings provided with automatic sprinkler systems installed in accordance with IFC Section 903.3.1.1 or 903.3.1.2.

Section 1103.7.1 Group E is amended by adding Exception 3 as follows:

3. Existing Group E occupancies with approved battery-operated smoke alarms shall be permitted to retain these devices until **January 1, 2019**. After **January 1, 2019**, all approved installations of battery-operated smoke alarms shall be replaced with UL 217 listed battery-operated smoke alarms provided with permanent integral 10-year lithium batteries and resistance to nuisance alarms. Continued use of battery-operated smoke alarms shall be subject to approval by the Fire Code Official.

Section 1103.8.3 Power source is amended by adding the following at the end of the section:

Existing Group I-1 and R occupancies with approved battery-operated smoke alarms shall be permitted to retain these devices until **January 1, 2019**. After **January 1, 2019**, all approved installations of battery-operated smoke alarms shall be replaced with UL 217 listed battery-operated smoke alarms provided with permanent integral 10-year lithium batteries and resistance to nuisance alarms. Continued use of battery-operated smoke alarms shall be subject to approval by the Fire Code Official.

Section 1103.9 Carbon monoxide alarms is amended by adding the following at the end of the section:

Effective upon adoption of this code by the authority having jurisdiction, existing I and R occupancies with approved battery-operated CO alarms shall replace such units upon activation of the unit end-of-life signal or in accordance with the manufacturer's recommendation. Where approved, replacement and new CO alarms shall be UL 2034 listed battery-operated CO alarms provided with permanent integral 10-year lithium batteries. Installation of new CO alarms in existing R occupancies where required by State of Colorado regulations shall comply with this requirement. Use of battery-operated CO alarms shall be subject to approval by the Fire Code Official. Listed combination smoke/CO alarms that comply with these requirements shall be permitted.

SECTION 1105

CONSTRUCTION REQUIREMENTS FOR EXISTING GROUP I-2

Section 1105.1 General is amended by adding an Exception as follows:

Exception: The requirements of IFC Section 1105 shall not apply for Group I-2 occupancies which comply with the 2012 NFPA 101 Chapter 19 provisions for existing hospitals, nursing homes, and limited care facilities. For the purposes of this exception; the term hospital, shall include general hospitals, psychiatric hospitals, and specialty hospitals, the term nursing home, shall include nursing and convalescent homes, skilled nursing facilities, intermediate care facilities, and infirmaries in homes for the aged.

Section 1107 Requirements for Compressed Gas Systems is added as follows:

SECTION 1107

REQUIREMENTS FOR COMPRESSED GAS SYSTEMS

1107.1 Compressed gas systems. Effective **January 1, 2018**, existing compressed gas systems located within existing buildings shall be retrofitted and modified in accordance with Sections 1107.1.1 through 1107.1.4.

1107.1.1 Carbon dioxide (CO₂) systems used in beverage dispensing applications. Existing carbon dioxide (CO₂) systems used in beverage dispensing applications shall comply with Section 5307.

1107.1.2 Inert gas systems used in commercial, manufacturing or industrial applications. Existing inert gas systems used in commercial, manufacturing or industrial applications shall comply with Section 5309.

1107.1.3 Carbon dioxide (CO₂) gas enrichment systems using on-site supply tanks and/or cylinders in plant growing (husbandry) applications. Existing carbon dioxide (CO₂) gas enrichment systems using on-site supply tanks and/or cylinders in plant growing (husbandry) applications shall comply with Section 5310.

1107.1.4 Carbon dioxide (CO₂) gas enrichment systems using a natural gas burner in plant growing (husbandry) applications. Existing carbon dioxide (CO₂) gas enrichment systems using a natural gas burner in plant growing (husbandry) applications shall comply with Section 5311.

SECTION 1108 Firefighter Fall Protection is added as follows:

SECTION 1108

FIREFIGHTER FALL PROTECTION

1108.1 Firefighter fall protection. The following precautions are required to ensure safe and effective rooftop access for rooftop maintenance and firefighting operations. Materials shall comply with UL 1994. Signs or decals shall be posted in English and in the predominant language of workers. Signs, decals and striping affixed to the exterior of the building shall be suitable for the environment. Provisions of items 1, 2 and 3 shall be completed by **July 1, 2017**.

1. Self-luminous or reflective signs or decals approved by the Fire Code Official are required on building exterior walls when the locations of rooftop access landing areas are not apparent from the street.
2. Self-luminous or reflective signs or decals approved by the Fire Code Official shall be attached to each skylight, trap door, roof hatch, and scuttle cover; the sign or decal shall be on the surface, with striping around the entire perimeter.
3. Self-luminous or reflective signs or decals approved by the Fire Code Official shall be placed at entries (doors, stairs, ladders, or roof hatches) to areas containing skylights, trap doors, roof hatches, and scuttle covers.
4. Existing non-metallic panels with curb heights eight inches or less that are present between metal panels on roofs shall be replaced with metal panel(s) with the equivalent gauge and material properties as the existing roof panels. Installation shall be completed by **July 1, 2017**. Perimeter guardrails or fall protection can be used in lieu of replacement of existing non-metallic panels when these systems comply with OSHA 29 CFR1926.502. Self-

luminous or reflective signs or decals approved by the fire code official shall be placed on perimeter guardrails.

Exception: One-family, two-family and townhome dwellings constructed in accordance with the IRC.

CHAPTER 20

AVIATION FACILITIES

SECTION 2001

GENERAL

2001.1 Scope. Airports, heliports, helistops, and aircraft hangers shall be in accordance with this Chapter and applicable sections of the IBC Appendix S.

SECTION 2005

PORTABLE FIRE EXTINGUISHERS

Section 2005.6 At fuel-dispensing stations is replaced as follows:

2005.6 At fuel-dispensing stations. Portable fire extinguishers for ramps where fueling operations are conducted are intended to provide an immediate means of fire protection in an area likely to contain a high concentration of personnel and valuable equipment. The prominent and strategic positioning of portable fire extinguishers is critical for them to be of maximum value in the event of an emergency. Portable fire extinguishers shall not be located in probable spill areas. To provide accessibility from adjoining gates, portable fire extinguishers shall be located approximately midway between gate positions.

Portable fire extinguishers at fuel-dispensing stations shall be located such that pumps or dispensers are not more than 50 feet from an extinguisher. The maximum distance between extinguishers shall not be over 200 feet. Where the specified portable fire extinguishers are brought into the aircraft fuel servicing areas prior to the fueling operation, they shall be located upwind not over 50 feet from the aircraft being serviced. Fire extinguishers shall be provided as follows:

1. Where the open-hose discharge capacity of the fueling system is not more than 200 gallons per minute, a minimum of two listed portable fire extinguishers complying with Section 906 and having a minimum rating of 20-B:C shall be provided.
2. Where the open-hose discharge of the fueling system is more than 200 gallons per minute but not more than 350 gallons per minute, a minimum of two listed wheeled extinguishers complying with Section 906 and having a minimum extinguishing rating of 80-B:C and a minimum agent capacity of 125 pounds shall be provided.
3. Where the open-hose discharge capacity of the fueling system is more than 350 gallons per minute, a minimum of three listed wheeled extinguishers complying with IFC Section 906, as amended, and having a minimum rating of 80-B:C each and a minimum capacity agent of 125 pounds each shall be provided.

SECTION 2006

AIRCRAFT FUELING

Section 2006.6 Emergency fuel shutoff is amended by adding the following at the end of the paragraph:

Emergency fuel shutoff switches shall be of a red, mushroom head type, listed for use, with a protective cover to prevent inadvertent contact and shall only be reset by a key accessible only to authorized personnel. Locations, performance and marking shall comply with NFPA 407.

SECTION 2006.12.1 Auxiliary power unit (APU) is added as follows:

2006.12.1 Auxiliary power unit (APU). Fuel servicing shall not be performed on a fixed-wing aircraft while an onboard engine, APU or heater, is operating.

Exception: In an emergency resulting from the failure of an onboard auxiliary power unit on a jet aircraft, and in absence of suitable ground support equipment, a jet engine mounted at the rear of the aircraft or on the wing on the side opposite the fueling point shall be permitted to be operated during fueling or defueling to provide power, provided that the operation follows approved written procedures.

SECTION 2007 HELISTOPS AND HELIPORTS

Section 2007.9 Helistops on roofs is added as follows:

2007.9 Helistops on roofs. In addition to other applicable portions of this Code, helistops located on roofs shall comply with the following:

1. Smoking is prohibited on the roof operating area during landing and takeoff operations.
2. Persons, other than helistop personnel, shall be restricted to designated protected or fenced waiting areas during landing and take-off operations.
3. Loose material such as gravel is prohibited.
4. Openings in the roof shall not be permitted in the immediate landing area.
5. Major repair and maintenance operations are not permitted on the helistop except in cases of emergency, and only with prior notification to the Fire Department.
6. Communication facilities shall be provided from the helistop to the department and building personnel for emergency notification.
7. Helistop personnel shall be trained in the use of communication and fire extinguishing equipment.
8. The storage of flammable liquids or highly combustible materials on the roof is prohibited.
9. An exterior (weatherproof) manual pull station shall be provided by each exit and shall be connected to the building alarm system.
10. At least 100 feet of approved 1.5-inch hose equipped with an approved fog nozzle and a 2.5-inch male NST reduced to a 1.5-inch male Denver thread shall be provided in a weatherproof cabinet adjacent to the roof standpipe.

CHAPTER 23

MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

SECTION 2303 LOCATION OF DISPENSING DEVICES

Section 2303.2 Emergency disconnect switches is replaced as follows:

2303.2 Emergency disconnect switches. An approved clearly identified and readily accessible emergency disconnect switch shall be provided at an approved location to stop the transfer of fuel to the fuel dispensers in the event of a fuel spill or other emergency. The emergency disconnect switch for exterior fuel dispensers shall be located in an accessible location outside in accordance with this section. Emergency disconnect switches shall be of a red, mushroom head type, listed for use, with a protective cover to prevent inadvertent contact and shall only be reset by a key located on premises accessible to authorized personnel. Installation of emergency disconnect switches shall comply with NFPA 70 (NEC). Emergency disconnects shall be located within 100 feet (30 480 mm) of but not less than 20 feet (6096 mm) from, the fuel dispensers. For interior fuel-dispensing operations, the emergency disconnect switch shall be installed at an approved location. All emergency disconnect switches shall be distinctly labeled as: **EMERGENCY FUEL SHUTOFF**. Signs shall be provided in approved locations. Access to emergency disconnect switches shall be unobstructed. Removal of equipment, merchandise, vehicles, storage, etc., to reach the emergency disconnect does not meet the requirement for a "readily accessible" location.

SECTION 2304 DISPENSING OPERATIONS

Section 2304.2.5 Communications is replaced as follows:

2304.2.5 Communications. The attendant shall be able to communicate with persons in the dispensing area at all times with a two-way hard-wired communication system. An approved method of communicating with the fire department shall be provided for the attendant.

SECTION 2305 OPERATIONAL REQUIREMENTS

Section 2305.6.1 Lettering is added as follows:

2305.6.1 Lettering. Warning signs shall have the word "**WARNING**" in red letters of not less than 1.5 inches in height and the remainder of the signs shall have red letters of not less than one (1) inch in height on a white background.

Exception: Existing approved signs consisting of contrasting lettering and background.

SECTION 2306 FLAMMABLE AND COMBUSTIBLE LIQUID MOTOR FUEL-DISPENSING FACILITIES

Section 2306.7.3 Mounting of dispensers is replaced as follows:

2306.7.3 Mounting of dispensers. In motor fuel-dispensing facilities the dispensing devices except those installed on top of a protected above-ground tank that qualifies as vehicle-impact resistant, shall be protected against physical damage by mounting on a concrete island 6 inches

(152 mm) or more in height and in accordance with IFC Section 312. Dispensing devices shall be installed and securely fastened to their mounting surface in accordance with the dispenser manufacturer's instructions. Dispensing devices installed indoors shall be located in an approved position where they cannot be struck by an out-of-control vehicle descending a ramp or other slope.

SECTION 2308

COMPRESSED NATURAL GAS MOTOR FUEL-DISPENSING FACILITIES

Section 2308.7 Emergency shutdown control is amended by adding the following after the last sentence.

The emergency shutdown control switch shall be of a type complying with Section 2303.2.

SECTION 2309

HYDROGEN MOTOR FUEL-DISPENSING AND GENERATION FACILITIES

Section 2309.5.3 Emergency shutdown control is amended by adding the following after the last sentence.

The emergency shutdown control switch shall be of a type complying with Section 2303.2.

SECTION 2311

REPAIR GARAGES

Section 2311.4.3 Ventilation is replaced as follows:

2311.4.3 Ventilation. Where Class I liquids or LP-gas are stored or used within a building having a basement or pit wherein flammable vapors could accumulate, the basement or pit shall be provided with mechanical ventilation in accordance with the *International Mechanical Code*, at a minimum rate of 1.5 cubic feet per minute per square foot (cfm/ft²) [0.008 m³/(s · m²)] to prevent the accumulation of flammable vapors. The fan shall be configured in such a way that it runs continuously and the exhaust inlet is placed within 12 inches of the pit floor.

Sections 2311.4.4 Fire protection systems is added as follows:

2311.4.4 Fire protection systems. In buildings equipped with an automatic sprinkler system, pits and below-grade work areas shall be protected. Sprinkler systems in pits and below-grade work areas shall be separately zoned and the control valve shall be located outside the pit or below-grade work area.

Section 2211.4.5 Flammable vapor monitoring is added as follows:

2311.4.5 Flammable vapor monitoring. Pits and below-grade work areas shall be equipped with a flammable vapor-monitoring alarm. Alarm notification shall be local only and provided in an approved location(s).

Section 2311.4.6 Warning signs is added as follows:

2311.4.6 Warning sign(s). Pits and below grade work areas shall be identified as required. Doors or openings leading to a pit or below grade work area shall be plainly marked with the words "**OPEN PIT**" in red letters at least six (6) inches high on a white background. Such warning signs shall be placed so as to be readily discernible.

Section 2311.7.2 Gas detection system is replaced as follows:

2311.7.2 Gas detection system. Repair garages used for repair of vehicles fueled by non-odorized gases, including, but not limited to, hydrogen and non-odorized LNG, shall be provided with a flammable gas detection system in accordance with IFC Sections 2311.7.2.1 through 2311.7.2.3, as amended. Emergency alarms shall be provided in accordance with Section 908.8.

Section 2311.7.2.2 Operation - Item 1 is replaced as follows:

1. Initiation of distinct audible and visual alarm signals in the repair garage in accordance with Section 908.8. Signage required by Section 908.8 shall state **“DO NOT ENTER WHEN LIGHT IS FLASHING – NONODORIZED FLAMMABLE GAS LEAK DETECTED.”**

Section 2312 Existing Motor Fuel-Dispensing Facilities is added as follows:

SECTION 2312

EXISTING MOTOR FUEL-DISPENSING FACILITIES

2312.1 Mounting of dispensers. Existing motor fuel dispensing facilities shall have the dispensing devices, except those installed on top of a protected above-ground tank that qualifies as vehicle-impact resistant, protected against physical damage in accordance with IFC Section 312. Dispensing devices shall be securely fastened to their mounting surface in accordance with the dispenser manufacturer's instructions. Dispensing devices installed indoors shall be located in an approved position where they cannot be struck by an out-of-control vehicle descending a ramp or other slope.

2312.2 Emergency disconnect switches. Existing motor fuel-dispensing facilities shall have an approved clearly identified and readily accessible emergency disconnect switch provided at an approved location to stop the transfer of fuel to the fuel dispensers in the event of a fuel spill or other emergency. The emergency disconnect switch for exterior fuel dispensers shall be located in an accessible location outside in accordance with this section. Emergency disconnect switches shall be of a red, mushroom head type, listed for use, with a protective cover to prevent inadvertent contact and shall only be reset by a key located on premises accessible to authorized personnel. Installation of emergency disconnect switches shall comply with NFPA 70 (NEC). Emergency disconnects shall be located within 100 feet (30480 mm) of but not less than 20 feet (6096 mm) from, the fuel dispensers. All emergency disconnect switches shall be distinctly labeled as **“EMERGENCY FUEL SHUTOFF.”** Signs shall be provided in approved locations.

CHAPTER 24

FLAMMABLE FINISHES

SECTION 2401

GENERAL

Section 2401.1 Scope, Item 4, is amended as follows:

4. Floor surfacing or finishing operations using Class I or II liquids

Section 2401.3.1 Water-based finishes is added as follows:

2401.3.1 Water-based finishes. Notwithstanding the provisions of IFC Section 2401.2, a permit is required to conduct a spraying or dipping operation utilizing water based liquids as set forth in Section 105.

Section 2401.3.2 Limited spraying spaces is added as follows:

2401.3.2 Limited spraying spaces. A permit is required to conduct a limited spraying operation as set forth in Section 105.

SECTION 2404

SPRAY FINISHING

Section 2404.6.1.2.1 Interlocks Item 3 is replaced as follows:

3. Have the ventilating system maintain a concentration 25 percent below the lower flammable limit (LFL) within the spray booth or spray room during the drying process and automatically shut off drying apparatus in the event of a failure of the ventilating system.

SECTION 2405

DIPPING OPERATIONS

Section 2405.7 Ventilation is replaced follows:

2405.7 Ventilation of flammable vapor areas. Mechanical ventilation shall be provided to maintain airborne concentrations below 25 percent the lower flammability limit (LFL). Required ventilation systems shall be arranged such that the failure of any ventilating fan shall automatically stop the dipping conveyor system.

SECTION 2410

FLOOR SURFACING AND FINISHING OPERATIONS

Section 2410.1 Scope is replaced as follows:

2410.1 Scope. Floor surfacing and finishing operations using Class I or Class II liquids shall comply with IFC Sections 2410.2 through 2410.5.

CHAPTER 25

FRUIT AND CROP RIPENING

SECTION 2503 ETHYLENE GAS

Sections 2503.3 Storage and 2503.4 Piping are added as follows:

2503.3 Storage. Containers other than those connected for use shall be stored outside of ripening process buildings or in a special building.

Exception: Storage of not more than two portable containers complying with IFC Section 5303.1 and approved for transportation is allowed in ripening process buildings.

2503.4 Piping. Piping containing ethylene shall be constructed of iron. Flexible connectors and hose, when used, shall be of an approved type. Tubing shall be of brass, copper, or stainless steel with not less than 0.049-inch (1.2 mm) wall thickness.

CHAPTER 26

FUMIGATION AND INSECTICIDAL FOGGING

SECTION 2601

GENERAL

Section 2601 Permits is replaced as follows:

2601.2 Permits. No person shall engage in the actual operation of fumigation or thermal insecticidal fogging without first obtaining a permit. No fumigation room, vault, or chamber using toxic or flammable fumigant shall be used or maintained without first obtaining a permit. Permits shall be required as set forth in Section 105.

Section 2601.3 License is added as follows:

2601.3 License. No person shall conduct fumigation or insecticidal operations without first being licensed.

SECTION 2603

FIRE SAFETY REQUIREMENTS

Section 2603.1.1 Storage warning signs is added as follows:

2603.1.1 Storage warning signs. Where fumigants and insecticidal fogging products are stored NFPA 704 placard guidelines shall be followed.

Section 2603.3.1 Warning signs is amended by adding the following after the first sentence:

Where fumigants and insecticidal fogging products are used, approved warning signs bearing the "skull and crossbones" emblem with the warning "**DANGER! POISON GAS! KEEP OUT!**" shall be posted.

Section 2603.3.1.1 Storage warning signs is added as follows:

2603.3.1.1 Storage warning signs. Where fumigants and insecticidal fogging products are stored, NFPA 704 placard guidelines shall be followed.

CHAPTER 27

SEMICONDUCTOR FABRICATION FACILITIES

SECTION 2703 **GENERAL SAFETY PROVISIONS**

Section 2703.12.1 General safety provisions is replaced as follows:

2703.12.1 Where required. Emergency alarm systems shall be provided in accordance with Section 908.8 in the areas indicated in IFC 2703.12.1.1 through 2703.12.1.3.

Section 2703.12.3.1 Emergency alarm signage is added as follows:

2703.12.3.1 Emergency alarm signage. Signage required by Section 908.8 shall state
“DO NOT ENTER WHEN LIGHT IS FLASHING – HAZARDOUS PRODUCTION MATERIAL
LEAK DETECTED.”

Section 2703.13.1 Where required is replaced as follows:

2703.13.1 Where required. A continuous gas detection system shall be provided in accordance with Section 908.8 in the areas indicated in IFC Sections 2703.13.1.1 through 2703.13.1.4.

Section 2703.13.2.1.1 Emergency alarm signage is added as follows:

2703.13.2.1.1 Emergency alarm signage. Signage required by Section 908.8 shall state,
“DO NOT ENTER WHEN LIGHT IS FLASHING – HAZARDOUS PRODUCTION MATERIAL
LEAK DETECTED.”

CHAPTER 28

LUMBER YARDS AND AGRO-INDUSTRIAL, SOLID BIOMASS AND WOODWORKING FACILITIES

SECTION 2804 FIRE PROTECTION

Section 2804.3 Portable fire extinguishers or standpipes and hose is replaced as follows:

2804.3 Portable fire extinguishers and standpipes. Portable fire extinguishers or standpipes supplied from an approved water system shall be provided within 50 feet (15240 mm) of travel distance to any machine producing shavings or sawdust. Extinguishers shall be provided in accordance with IFC Section 906, as amended, for extra-high hazards.

SECTION 2809 EXTERIOR STORAGE OF FINISHED LUMBER AND SOLID BIOFUEL PRODUCTS

Section 2809.5 Fire protection is replaced as follows:

2809.5 Fire protection. An approved hydrant and portable fire-extinguishing equipment suitable for the fire hazard involved shall be provided for open storage yards. Hydrant systems shall be installed in accordance with NFPA 24. Portable fire extinguishers complying with IFC Section 906, as amended, shall be located so that the travel distance to the nearest unit does not exceed 75 feet (22860 mm). Portable fire extinguishers located in open storage yards shall be protected from weather and shall be maintained in accordance with NFPA 10. Portable fire extinguishers complying with IFC Section 906, as amended, and with a minimum rating of 4-A:40-B:C shall be provided on all vehicles operating in a lumber storage yard.

CHAPTER 30

INDUSTRIAL OVENS

SECTION 3003

LOCATION

Section 3003.5 Location is added as follows:

3003.5 Location. Ovens, oven heaters and related equipment shall be located with due regard to the possibility of fire resulting from overheating or the escape of fuel gas or fuel oil and the possibility of damage to the building and injury to persons resulting from explosion.

1. Ovens shall be located at or above grade.

Exception: Ovens shall be permitted in basements where at least 50% of the wall area of the room in which the oven is located is above grade.

2. Ovens shall be located to be readily accessible for inspection and maintenance and with adequate clearances to permit the proper functioning of explosion vents.

Section 3003.6 Relief (explosion) vents is added as follows:

3003.6 Relief (explosion) vents. Ovens which may contain flammable air-gas mixtures shall be equipped with relief vents for freely relieving internal explosion pressures.

Section 3003.7 Ductwork is added as follows:

3003.7 Ductwork. All ductwork shall be constructed of approved non-combustible material. Ducts shall be made tight throughout and shall have no openings other than those required for the proper operation and maintenance of the system. Ducts passing through combustible walls, ceilings, floors or roofs shall provide adequate insulation and clearances to prevent surface temperatures from exceeding 160 degrees F. Exhaust ducts shall not discharge within 10 feet of doors, windows or other air intakes in a manner that will permit re-entry of vapors into the building.

CHAPTER 31

TENTS AND OTHER MEMBRANE STRUCTURES

SECTION 3103

TEMPORARY TENTS AND MEMBRANE STRUCTURES

Section 3103.2- Approval required is replaced as follows:

3103.2 Approval required. Tents and membrane structures having an area in excess of 200 square feet shall not be erected, operated, or maintained for any purpose without first obtaining a permit and approval from the Fire Code Official in accordance with Section 105.

Exceptions:

1. Tents used exclusively for recreational camping purposes.
2. Tents open on all sides that comply with all of the following:
 - 2.1 Individual tents having a maximum size of 400 square feet (65 m²).
 - 2.2 The aggregate area of multiple tents placed side by side without a firebreak clearance of 12 feet (3658 mm), not exceeding 400 square feet (37 m²) total.
 - 2.3 A minimum clearance of 12 feet (3658 mm) to all structures and other tents.

Section 3103.9 Anchorage required is amended by replacing the last sentence as follows:

Documentation of structural stability in accordance with IBC Section 3102.7 shall be furnished to the Fire Code Official on request.

SECTION 3104

TEMPORARY AND PERMANENT TENTS AND MEMBRANE STRUCTURES

Section 3104.20 Standby personnel is replaced as follows:

3104.20 Fire watch personnel. When, in the opinion of the Fire Code Official, it is essential for public safety in a tent, or membrane structure used as a place of assembly or any other use where people congregate, or any building premise or property where people congregate, because of the number of persons, or the nature of the performance, exhibition, display, contest, or activity, or when potentially hazardous conditions exist, or an occupant load varies due to large crowd movement from one building to another building or one area of a building to another area of the building, or there is a reduction in a life safety feature, or there is an impairment to a fire protection feature, the owner, agency, or lessee shall employ and compensate, one or more qualified individual, as required by the Fire Code Official. Such qualified individual(s) shall be subject to the fire code official's orders at all times when so employed and shall remain on duty during the times such places are open to the public or when such activity is being conducted or, in the case of residential occupancies, whenever occupied.

Section 3104.20.3 Permit required is added as follows:

3104.20.3 Permit required. A fire watch operational permit shall be acquired in accordance with Section 105 prior to any occupancy of the tent or membrane structure.

CHAPTER 32

HIGH-PILED COMBUSTIBLE STORAGE

SECTION 3201

GENERAL

Section 3201.3 Construction documents is replaced as follows:

3201.3 Construction documents. A construction permit shall be required in accordance with Section 105 for the installation or reconfiguration of all high-piled storage systems. Installation plans and specifications shall be submitted for review and approval and shall include the information specified in Appendix N. Approved plans shall be maintained on the premises in an approved location and available to Fire Department personnel upon request.

SECTION 3206

GENERAL FIRE PROTECTION AND LIFE SAFETY FEATURES

Table 3206.2 General Fire Protection and Life Safety Requirements is replaced as follows:

TABLE 3206.2
GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

COMMODITY CLASS	SIZE OF HIGH-PILED STORAGE AREA a (square feet) (see IFC Sections 3206.2 and 3206.4)	SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (See IFC Section 3207.3)			Maximum pile dimension c (feet)	Maximum permissible storage height d (feet)	Maximum pile volume (cubic feet)
		Automatic fire-extinguishing system (see IFC Section 3206.4)	Building Access (see IFC Section 3206.6)	Smoke and heat removal (see IFC Section 3206.7)			
I-IV	0-500	Not Required a	Not Required e	Not Required	Not Required	Not Required	Not Required
	501-2,500	Yes a,i	Not Required e	Not Required	100	40	100,000
	2,501-12,000	Yes	Not Required e	Not Required	100	40	400,000
	12,001-20,000	Yes	Yes	Yes j	100	40	400,000
	20,001-500,000	Yes	Yes	Yes j	100	40	400,000
	Greater than 500,000 g	Yes	Yes	Yes j	100	40	400,000
High hazard	0-500	Not Required a	Not Required e	Not Required	50	Not Required	Not Required
	501-2,500	Yes	Not Required e	Not Required	50	30	75,000
	2,501-300,000	Yes	Yes	Yes j	50	30	75,000
	300,001-500,000 g, h	Yes	Yes	Yes j	50	30	75000

For SI: 1 foot = 304.8mm, 1 cubic foot = 0.02832m³, 1 square foot = 0.0929m²

- When automatic sprinklers are required for reasons other than those in IFC Chapter 32, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 3207 and 3208.
- For aisles, see Section IFC 3206.9
- Piles shall be separated by aisles complying with Section IFC 3206.9
- For storage in excess of the height indicated, special fire protection shall be provided in accordance with Note g where required by the fire code official. See IFC Chapters 51 and 57, as amended, for special limitations for aerosols and flammable and combustible liquids, respectively.
- IFC Section 503, as amended, shall apply for fire apparatus access.

- f. Intentionally deleted.
- g. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in rack sprinklers, without associated reductions in ceiling sprinkler density; or additional fire department hose connections shall be provided when required by the fire code official.
- h. High-piled storage areas shall not exceed 500,000 square feet. A 2-hour fire wall constructed in accordance with IBC Section 706 shall be used to divide high-piled storage exceeding 500,000 square feet in area.
- i. Sprinkler protection is not required for storage of Class I commodities. Sprinkler protection in accordance with NFPA 13 or automatic fire detection shall be provided in accordance with IFC Section 3206.5 for Class II, III and IV commodities.
- j. Not required where storage areas are protected by early suppression fast response (ESFR) sprinkler systems or control mode special application sprinklers with a response time index of 50 (m s) $\frac{1}{2}$ or less that are listed to control a fire in the stored commodities with 12 or fewer sprinklers and installed in accordance with NFPA 13.

Section 3206.6.1.1 Number of doors required - Exception is replaced as follows:

Exception. The linear distance between adjacent access doors is allowed to exceed 100 feet but not to exceed 200 feet in existing buildings constructed **prior to May 2011** where no change in occupancy is proposed. The number and distribution of access doors in existing buildings shall be approved by the Fire Code Official.

Section 3206.6.1.4 Storage above doors is added as follows:

3206.6.1.4 Storage above doors. The clear height in accordance with IFC Section 3206.9.2 shall be maintained to the access doors. No racking components shall be located in the clear height.

Exceptions:

- 1. Rack structure provided for lateral bracing or rack stability and not able to be utilized for storage.
- 2. A single 24-inch catwalk as permitted by IFC Section 3206.9.1, Exception 1.

Section 3211 Existing Buildings is added as follows:

**SECTION 3211
EXISTING BUILDINGS**

3211.1 Scope - Existing buildings constructed prior to October 1990. This section is applicable to high-piled or rack storage in existing buildings as follows:

- 1. Any modification to the existing commodities stored in an existing tenant space where storage height is increased or classification of the commodities is placed in a higher category in accordance with IFC Section 3203.
- 2. New tenant spaces in existing buildings.
- 3. Existing tenant spaces with new tenants.
- 4. In buildings that were built and occupied by a tenant with high-piled combustible stock prior to the adoption of the Uniform Codes on **October 1, 1990**; as long as that tenant remains in operation, it will be up to the Fire Department inspection to identify any unsafe conditions in accordance with Section 110.

3211.2 Storage of Class I commodity – as defined by NFPA 13.

3211.2.1 Automatic sprinklers. Where an automatic sprinkler system is required by Table 3206.2, an approved automatic sprinkler system shall be provided in accordance with NFPA 13.

Exception: Existing automatic sprinkler systems shall be accepted provided that the system has been certified by a qualified Colorado professional engineer to provide a minimum design density to a minimum of 70% of that required by NFPA 13 but not less .2 gpm over 2,000 sq. ft. Density reductions or adjustments permitted by NFPA 13 shall not apply for determination of the 70% minimum density.

3211.2.2 Building access. Building access from fire apparatus access roads in accordance with IFC Section 503, as amended, shall be provided within 200 feet of all portions of the exterior walls of a building used for high-piled storage.

3211.2.2.1 Access doors. Fire Department access doors shall be provided in accordance with IFC Section 3206.6.1, as amended.

3211.2.3 Aisles. Shall be in accordance with IFC Section 3206.9 or 903.3.1; the most restrictive shall govern.

3211.2.4 Portable fire extinguishers. Shall be in accordance with IFC Section 3206.10.

3211.3 Storage of Class II and III commodity - as defined by NFPA 13.

3211.3.1 Automatic sprinklers. Where an automatic sprinkler system is required by Table 3206.2, an approved automatic sprinkler system shall be provided in accordance with NFPA 13.

Exception: Existing automatic sprinkler systems shall be accepted provided that the system has been certified by a qualified Colorado professional engineer to provide a minimum design density to a minimum of 70% of that required by NFPA 13, but not less .2 gpm over 2,000 sq. ft. Density reductions or adjustments permitted by NFPA 13 shall not apply for determination of the 70% minimum density.

3211.3.2 Building access. Building access from fire apparatus access roads in accordance with IFC Section 503, as amended, shall be provided within 200 feet of all portions of the exterior walls of a building used for high-piled storage.

3211.3.2.1 Access doors. Fire Department access doors shall be provided in accordance with IFC Section 3206.6.1, as amended.

3211.3.3 Smoke and heat removal. Smoke and heat vents shall be provided in accordance with Table 3206.2 with a minimum vent area of 1:200.

Exceptions: Existing roof openings such as skylights may be used as smoke vents in accordance with Section 1108 - Item 4.

3211.3.4 Aisles. Shall be in accordance with IFC Section 3206.9 or 903.3.1; the most restrictive shall govern.

3211.3.5 Portable fire extinguishers. Shall be in accordance with IFC Section 3206.10.

3211.4 Storage of Class IV, high-hazards and plastics commodities - as defined by NFPA 13.

3211.4.1 Automatic sprinklers. Where an automatic sprinkler system is required by Table 3206.2, an approved automatic sprinkler system shall be provided in accordance with NFPA 13.

3211.4.2 Building access. Building access from fire apparatus access roads in accordance with IFC Section 503, as amended, shall be provided within 150 feet of all portions of the exterior walls of building used for high-piled storage.

3211.4.2.1 Access doors. Fire Department access doors shall be provided in accordance with IFC Section 3206.6.1, as amended.

3211.4.3 Smoke and heat removal. Smoke and heat vents shall be provided in accordance with Table 3206.2 with a minimum vent to floor area ratio of 1:200.

3211.4.4 Aisles. Shall be in accordance with IFC Section 3206.9.

3211.4.5 Portable fire extinguishers. Shall be in accordance with IFC Section 3206.10.

CHAPTER 33

FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

SECTION 3301 **GENERAL**

Section 3301.3 Permit required is added as follows:

3301.3 Permit required. Permits shall be required as set forth in Section 105 for the activities or uses regulated by IFC Sections 3303 – Temporary Heating Equipment, 3304.3 – Burning of combustible debris, rubbish and waste, 3304.4 - Open Burning, 3304.5 – Fire Watch, 3304.6 – Cutting and Welding, 3305.1 Storage of Flammable and Combustible Liquids, 3305.2–Class I and Class II Liquids, 3306.1– Storage and Handling (Flammable Gases), 3307.1 – Storage and Handling (Explosive Materials), 3317- Safeguarding Roofing Operations, and 3318 – Asbestos Operations.

SECTION 3311 **MEANS OF EGRESS**

Section 3311.1 Stairways required is amended as follows:

3311.1 Stairways required. Where a building has been constructed to a building height of 40 feet (15 240 mm) or four stories, or where an existing building exceeding 40 feet (15 240 mm) in building height is altered, not less than one temporary lighted stairway shall be provided unless one or more of the permanent stairways are erected as the construction progresses.

SECTION 3313 **STANDPIPES**

Section 3313.1 Where required is replaced as follows:

3313.1 Where required. Buildings four or more stories in height shall be provided with not less than one standpipe for use during construction. Such standpipes shall be installed when the progress of construction is not more than 30 feet in height above the lowest level of Fire Department vehicle access or where the floor level of the lowest story is located more than 30 feet below the highest level of Fire Department vehicle access. Such standpipes shall be provided with Fire Department hose connections at accessible locations adjacent to usable stairs. Such standpipes shall be extended as construction progresses to within one floor of the highest point of construction having secured decking or flooring. One fire department connection [not less than two (2) 2.5-inch inlets with 4-inch piping] shall be provided for buildings less than 200 feet in height. Where building exceeds 200 feet in height, two (2) separate 6-inch manual dry standpipes shall be required. These standpipes shall be located adjacent to a usable stair with a 200 feet maximum separation between standpipes. Each standpipe shall be connected to two (2) 2.5-inch inlet fire department connections. Each fire department connection shall be signed indicating which standpipe it serves. The fire department connection(s) shall be provided in accordance with IFC Section 912, as amended, at a location visible from the public way, accessible to fire apparatus and approved by Fire Code Official.

Section 3318 Asbestos Operations is added as follows:

**SECTION 3318
ASBESTOS OPERATIONS**

3318.1 General. Operations involving asbestos or asbestos-containing materials in buildings and other structures regulated by this code shall be in accordance with this Section.

3318.2 Notification. The Fire Code Official shall be notified 24 hours prior to the commencement and closure of asbestos operations. The permit applicant shall notify the building official when asbestos abatement involves the removal of materials which were used as a feature of the building's fire resistance.

3318.3 Signs. Approved signs shall be posted at the entrance, exit, decontamination areas and waste-disposal areas for asbestos operations. The signs shall state asbestos abatement operations are in progress in the area, asbestos is a suspected carcinogen and proper respiratory protection is required. Signs shall have a reflective surface and lettering shall be a minimum of two inches (51 mm) in height.

CHAPTER 34

TIRE BUILDING AND TIRE STORAGE

SECTION 3408

FIRE PROTECTION

Section 3408.3 Automatic sprinkler systems is added as follows:

3408.3 Automatic sprinkler systems. Automatic sprinkler systems shall be installed in accordance with Section 903.2.9.2.

CHAPTER 35 WELDING AND OTHER HOT WORK

SECTION 3501 GENERAL

Section 3501.3 Restricted areas is amended by adding Item 6 as follows:

6. Areas where uncleaned or improperly prepared drums, tanks, or other containers and equipment that have previously contained materials that could develop explosive atmospheres.

SECTION 3505 GAS WELDING AND CUTTING

Section 3505.2 Cylinder and container storage, handling and use is replaced as follows:

3505.2 Cylinder and container storage, handling and use. Storage, handling and use of compressed gas cylinders, containers and tanks shall be in accordance with this section and Chapter 53, as amended. Ordinary rope slings or electromagnets shall not be used.

SECTION 3508 ACETYLENE GENERATORS

Section 3508.1 Use of acetylene generators is replaced as follows:

3508.1 Use of acetylene generators. The use of acetylene generators shall comply with this Section and NFPA 51 and 51A.

CHAPTER 38 ALCOHOL BEVERAGE PRODUCTION FACILITIES is added as follows:

CHAPTER 38

ALCOHOL BEVERAGE PRODUCTION FACILITIES

SECTION 3801

GENERAL

3801.1 Scope. Buildings and portions thereof where ethanol mixtures are produced, stored, handled or dispensed in the production of alcohol beverages shall be regulated in accordance with this Chapter and the *International Building and Fire Code*.

The intent of this Chapter is to establish minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing alcohol beverage production facilities (ABPFs) such as distilleries, breweries, and wineries, and to provide safety to fire fighters and emergency responders during emergency operations. The objective is to consolidate regulations for materials, systems, processes, and conditions most commonly found in ABPFs to facilitate compliance with the intent of this chapter.

The fire and building code officials are authorized to enforce applicable provisions of the *Building and Fire Code*, referenced standards, and recommended practices not specifically addressed in this chapter provided they are consistent with the intent and objective of this chapter. Consideration shall be given to the unique materials and equipment utilized in this industry such as wooden casks (typically barrels) and high quality but as-yet, unlisted, stills.

Unless otherwise noted, where provisions in this chapter conflict with provisions in other sections of the *International Building and Fire Code* for ABPFs, the most restrictive shall apply.

3801.2 Referenced standards. The Fire and Building code officials are authorized to enforce applicable provisions of the standards listed in IFC Chapter 80, as amended and IBC Chapter 35 as amended to ensure the safe operation of ABPFs. Table 3801.2 lists the standards most often utilized for ABPFs.

Table 3801.2 Referenced Standards

DOCUMENT	TITLE
NFPA 13	Standard for the Installation of Sprinkler Systems
NFPA 30	Flammable and Combustible Liquids Code
NFPA 61	Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities
NFPA 69	Standard on Explosion Prevention Systems
NFPA 70	National Electrical Code (NEC)
NFPA 72	National Fire Alarm and Signaling Code
NFPA 505	Fire Safety Standard For Powered Industrial Trucks Including Type Designations, Areas Of Use, Conversions, Maintenance, And Operations
NFPA 704	Standards System for Identification of the Hazards Materials for Emergency Response
NFPA 780	Standard for the Installation of Lightning Protection Systems

3801.3 Recommended practices. The Fire and Building code officials shall have the authority to utilize the recommended practices listed in Table 3801.3 to render interpretations and develop policies and procedures in the application of the provisions of the *International Building and Fire Code* and referenced standards. Such interpretations, policies, and procedures shall be in compliance with the intent and objective of this chapter.

Table 3801.3 Recommended Practices

NFPA 77	Recommended Practice on Static Electricity
NFPA 497	Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
NFPA 499	Recommended Practice for the Classification of Combustible Dusts and of Hazardous Locations for Electrical Installations in Chemical Process Areas
The Distilled Spirits Council of the United States, Inc.	Recommended Fire Protection Practices for Distilled Spirits Beverage Facilities

3801.4 Construction Documents. Construction documents shall be submitted for review and permit prior to the installation, construction, or modification of ABPFs or the operational equipment therein.

3801.5 Operational Permits. Operational permits shall be required as set forth in Section 105.

SECTION 3802

DEFINITIONS, ACRONYMS AND ABBREVIATIONS

3802.1 Definitions. The following terms are defined in Chapter 2.

ALCOHOL BEVERAGE

ALCOHOL BEVERAGE PRODUCTION FACILITY (ABPF)

ALCOHOL BY VOLUME (ABV)

BEVERAGE SPIRIT (TTB)

BREWERY

BULK STORAGE

CASK

CLASS 1 LIQUIDS

CONTAINER

DENVER BUILDING CODE

DENVER BUILDING AND FIRE CODE

DENVER FIRE CODE

DISTILLATION

DISTILLERY (ALSO “DISTILLED SPIRITS PLANT – BEVERAGE”)

DISTILLED SPIRITS PLANT – INDUSTRIAL

DISTILLED SPIRITS PLANT – INDUSTRIAL / BEVERAGE

DISTILLED SPIRITS PLANT – EXPERIMENTAL

ETHANOL (ALSO, “ETHYL ALCOHOL” OR “GRAIN ALCOHOL”)

ETHANOL MIXTURE

FERMENTATION

HAZMAT

HAZMAT INVENTORY STATEMENT (HMIS)
 HAZMAT MANAGEMENT PLAN (HMMP)
 HAZMAT REPORT (HMR)
 INTERMEDIATE BULK CONTAINER
 LOWER FLAMMABLE LIMIT (LFL)
 MASH
 MINIMUM EXPLOSIVE CONCENTRATION (MEC)
 NORMALLY CLOSED
 NORMALLY OPEN
 PILE
 PORTABLE TANK
 PROCESS DESCRIPTION
 PRESSURE VESSEL
 PROCESSING VESSEL
 RACK
 REMOTE AREA
 SPIRIT
 STATIONARY TANK
 STILL
 STORAGE AREA
 TANK
 USE AREA
 VAT (ALSO Foudre)
 WASH (ALSO BEER, MALT LIQUOR)
 WINE
 WINERY
 WORT
 VESSEL

3802.2 Acronyms and abbreviations. The following acronyms and abbreviations shall, for the purposes of this chapter, have the meanings identified below:

ABPF. Alcohol Beverage Production Facility.
ABV. Alcohol by Volume.
ASME. American Society of Mechanical Engineers.
ASTM. American Society for Testing and Materials.
HMIS. HazMat Inventory Statement.
HMMP. HazMat Management Plan.
HMPA. HazMat Permit Application.
HMR. HazMat Report.
LEL. Lower Explosive Limit.
LFL. Lower Flammable Limit.
MAQ. Maximum allowable quantity per control area in accordance with IFC Section 5003.1.1.
MEC. Minimum Explosive Concentration.
MSDS. Material Safety Data Sheet
NEC. National Electrical Code
TTB. Alcohol and Tobacco Tax and Trade Bureau

SECTION 3803

GENERAL REQUIREMENTS

3803.1 Material classification. Hazard classifications and analyses of ethanol mixtures shall account for altitude-dependent properties based on an elevation of 5,280 feet (1,609 m) above sea level.

Ethanol mixtures that have no fire point when tested in accordance with ASTM D 92, *Standard Test Method for Flash and Fire Points*, by Cleveland Open Cup Tester and ethanol mixtures with 16 percent or less ABV with the remainder comprised of materials with hazards not regulated by the *Denver Building and Fire Code* shall not be regulated as flammable or combustible liquids.

Ethanol mixtures with greater than 16 percent ABV and less than or equal to 34 percent ABV, and the remainder comprised of water and other materials with hazards not regulated by the *International Building and Fire Code*, shall be classified as Flammable 1C liquids.

Ethanol mixtures with greater than 34 percent ABV, and the remainder comprised of water and other materials with hazards not regulated by the *International Building and Fire Code*, shall be classified as flammable 1B liquids.

3803.2 Occupancy classification. The occupancy classification of use areas and storage areas including grain-handling and bottling/packaging systems and processes shall be classified in accordance with Sections 3803.2.1 through 3803.2.3.

3803.2.1 H-2 occupancy classification. An H-2 occupancy classification shall be assigned to buildings or portions thereof in accordance with Sections 3803.2.1.1 and 3803.2.1.2.

3803.2.1.1 Combustible dust producing operations. ABPFs or portions thereof containing equipment, systems and processes where grains are stored, transferred or milled in such a manner that the confinement conditions and dust concentrations create a fire or explosion hazard shall be in accordance with IFC Chapter 22 and IFC Chapter 50, as amended. The fire and building code officials are authorized to require technical assistance in accordance with Section 104 to establish whether the building or portion thereof is required to be assigned an H-2 occupancy classification and to determine explosion and deflagration hazard reduction criteria.

3803.2.1.2 Flammable liquids. ABPFs and portions thereof with quantities of Class 1 Liquids in excess of the MAQs, that are stored or processed in normally open vessels or systems, or vessels or systems that are pressurized at more than 15 pounds per square inch gauge (psig; 103.4 kPa), or where a Class 1 Liquid is released to atmosphere at or above its flash point temperature as part of normal operations shall be assigned an H-2 occupancy classification.

3803.2.2 H-3 occupancy classification. ABPFs and portions thereof with quantities of Class 1 Liquids in excess of the MAQs, that are stored or processed in normally closed vessels or systems pressurized to 15 pounds per square inch gauge (psig; 103.4 kPa) or less, shall be classified as H-3 occupancies.

Exception: Quantities of ethanol mixtures beverages exceeding the MAQs but packaged in individual containers not exceeding 1.3 gallons (5 L) in volume shall not cause the ABPF or portion thereof to be assigned an H-3 occupancy classification.

3803.2.3 Non-high hazard occupancy classification. Control areas with Class 1 Liquids, combustible dust production, or other regulated hazards shall be assigned an occupancy classification in accordance with the *International Building and Fire Code* according to the fire safety and relative hazard involved.

3803.3 Hazardous materials permit application (HMPA). An HMPA in an approved format is required for all ABPFs using or storing HazMat. It shall contain at a minimum, an HMR, HMMP, process description, fire-safety and evacuation plans, and a storage plan.

3803.3.1 Hazardous materials report (HMR). An HMR in an approved format is required for all facilities using or storing HazMat. It shall contain at a minimum, critical personnel contact information, pertinent building construction and occupancy information, and an HMIS.

3803.3.2 Hazardous materials management plan (HMMP). An HMMP in accordance with Section 5001.5.1 and Appendix H101 shall be provided in an approved format.

3803.3.3 Process description. A process description shall be provided in an approved format.

3803.3.4 Emergency Planning. Fire safety and evacuation plans in accordance with IFC Section 404, as amended, shall be prepared and maintained.

3803.3.5 Storage plan. Aisle and storage plans shall be submitted in accordance with IFC Chapter 50, as amended.

3803.3.6 Material safety data sheets. MSDS shall be readily available on the premises for HazMat therein.

3803.3.7 Unauthorized Discharges Preparation. Plans and provisions shall be made for controlling and mitigating unauthorized discharges.

3803.3.8 Personnel training and written procedures. Persons responsible for the operations in Class 1 Liquid storage areas or use areas shall be familiar with the chemical nature of the materials and the appropriate mitigating actions necessary in the event of fire, leak, or spill.

3803.3.9 Fire department liaison. Responsible persons shall be designated and trained to be liaison personnel to the fire department. They shall aid the fire department in preplanning emergency responses and identifying the locations of HazMat, shall have access to MSDS and be knowledgeable in the site's emergency response procedures.

3803.4 Unauthorized discharges. When Class 1 Liquids are released in quantities reportable under state, federal or local regulations, the fire code official shall be notified and action shall be taken in accordance with Sections 3803.4.1 and 3803.4.2.

3803.4.1 Records. Accurate records shall be kept of all unauthorized discharges of Class 1 Liquids by the permittee.

3803.4.2 Responsibility for cleanup. The person, firm or corporation responsible for an unauthorized discharge shall institute and complete all actions necessary to remedy the effects of such unauthorized discharge, whether sudden or gradual, at no cost to the jurisdiction. When deemed necessary by the fire code official, cleanup may be initiated by the fire department or by an authorized individual or firm. Costs associated with such cleanup shall be borne by the owner, operator or other person responsible for the unauthorized discharge.

3803.5 Construction. The construction of ABPFs shall be in accordance with Sections 3803.5.1 and 3803.5.2.

3803.5.1 General. Special detailed requirements, building heights, allowable areas, construction types, control areas, rated assemblies, finishes, means of egress, accessibility, interior environment, energy efficiency, exterior walls, roofing, structural design, fire service features,

building services and systems, and fire and smoke protection shall be in accordance with the *International Building and Fire Code* for the assigned occupancy classifications and this Chapter.

3803.5.2 Floors. Floors of use areas and storage areas for Class 1 Liquids shall be of noncombustible construction. Floor surfacing shall not be reactive with ethanol.

3803.6 Systems, features and components. Systems, features and components shall be provided in accordance with Sections 3803.6.1 through 3803.6.13.

3803.6.1 Deflagration prevention by combustible concentration reduction. Atmospheric concentration of flammable vapors shall be maintained at or below 25 percent of the LFL, and combustible dusts at or below 25 percent of the MEC, in all areas of the ABPF or portion thereof where they could collect or migrate. Good housekeeping shall be exercised to prevent accumulation of combustible dust on all exposed surfaces at all levels throughout the building.

Indoor storage areas and use areas are permitted to be provided with natural ventilation where it can be shown to maintain the atmospheric concentrations at or below 25 percent of the LFL and MEC for the materials under consideration.

Where natural ventilation is not adequate, Class 1 Liquid use areas, storage areas and equipment, machinery, and operations which produce or emit combustible dust, shall be provided with an approved mechanical collection and exhaust system in accordance with Sections 501, 502.1, 502.8, 502.9.5 and 503 of the *International Mechanical Code*.

Use areas and storage areas in ABPFs or portions thereof where Class 1 Liquid vapor concentrations cannot be maintained at or below 25 percent of the LFL, or confined enclosures where the concentration of combustible dust cannot be maintained at or below 25 percent of the MEC, shall be provided hazardous exhaust in accordance with Sections 510 and 511 of the *International Mechanical Code*.

3803.6.1.1 System requirements. Exhaust ventilation systems shall comply with all of the following:

1. Installation shall be in accordance with the *International Mechanical Code*.
2. Mechanical ventilation over the storage area or use area shall be at a rate of not less than 1 cubic foot per minute per square foot [cfm/ft²; 0.00508 cms/m²] of floor area.

Exception: Areas where Class 1 Liquids are stored in casks are permitted to be provided with an engineered ventilation system in accordance with *International Mechanical Code* Chapter 4. The air flow rate shall not be less than the greater of (1) that required to maintain the flammable vapor concentration in the storage area at or below 25 percent of the LFL, or (2) 0.06 cubic feet per minute per square foot (cfm/ft²; 0.000305 cms/m²).

3. Systems shall operate continuously unless alternative designs are approved.
4. A manual shutoff control shall be provided outside of the room in a position adjacent to the access door to the room, or in an approved location. The switch shall be a break-glass or other approved type and shall be labeled, "**VENTILATION SYSTEM EMERGENCY SHUTOFF.**"
5. Exhaust ventilation shall be designed to consider the density of the material released. For ethanol vapor, inlet air shall be introduced, and exhaust shall be taken, from a point within 12 inches (305 mm) of the floor. For dust, inlet air shall be introduced at a point within 12 inches (305 mm) of the floor and exhaust shall be taken as close to the dust generation source as possible.

6. The location and configuration of both the inlet and exhaust air openings shall be designed to provide air movement across all portions of the floor or room to prevent the accumulation of flammable vapors and suspended dust.
7. Exhaust air shall not be recirculated to occupied areas.

3803.6.2 Spill control and secondary containment. Spill control and secondary containment shall be provided in accordance with Sections 3803.6.2.1 through 3803.6.2.2.

3803.6.2.1 Indoor. Spill control and secondary containment shall be provided for H-2 and H-3 occupancies in ABPFs where:

1. The capacity of any single normally closed vessel or system with Class 1 Liquids exceeds 55 gallons (208 L);
2. The aggregate capacity of multiple normally closed vessels or systems with Class 1 Liquids exceeds 1,000 gallons (3,785 L); or
3. Class 1 Liquids are dispensed into or from a normally open vessel or system exceeding a 5.3-gallon (20 L) capacity.

3803.6.2.1.1 Design. The drainage system shall be in accordance with the *International Plumbing Code* and the following:

1. All portions of the drainage system including floors shall be liquid-tight and constructed of noncombustible materials compatible with ethanol.

Exception: Where approved by the Fire and Building Code officials, and in compliance with federal, state, and local government agencies' regulations and permits, floors of buildings or portions thereof used for the bulk storage of Class I Liquids are permitted to be exposed earth. Combustible materials such as tilled organic matter are permitted to be mixed with the dirt provided the mixture is non-combustible.

2. The drains and drainage system capacity shall be sized to carry the volumetric flow of water discharged from the automatic sprinkler system without backing up at the drains or pooling to a depth greater than $\frac{1}{4}$ " (6.5mm). The sprinkler coverage area used to calculate the required volumetric flow is permitted to be based on the smaller of (1) the remote area in accordance with NFPA 13 – provided it is located in the area served by the drains – or (2) the area of the building or portion thereof served by the drains.

Exception: When released onto the ground within a fire area, the volumetric flow of water is permitted to be reduced to account for the percolation into the soil. An engineering analysis shall be provided to establish the reduction.

3. Floors shall slope to drains. Impermeable curbs and floor slope shall be designed to prevent spilled Class I Liquids and water discharged from the automatic sprinkler system from flowing to adjoining areas. Floor slope shall not be less than 2%.

Exceptions:

1. Floors in existing buildings with less than 2% slope are permitted to be used provided they are made liquid tight and floor sinks are installed as necessary to preclude water discharged from the automatic sprinkler system from pooling in low spots. These drains shall be installed in addition to the drains required in Item 2 of this section.
2. Where trench drains or a combination of impermeable curbs and trench drains surround the sprinkler coverage area, the floors shall slope to the drains at a rate of not less than 1%. Where a combination

of impermeable curbs and trench drains is used, no less than 50% of the perimeter shall be protected by trench drains.

4. Drainage systems shall terminate in an approved secondary containment reservoir designed to contain a spill from the largest vessel in the area served by the drains plus the volumetric flow of water calculated in Item 2 above for a period of 20 minutes. An approved automatic monitoring method shall be provided to detect material in the reservoir. Monitoring devices shall be connected to approved visual and audible alarms. Reservoir capacity to accommodate the required secondary containment volume shall be maintained at all times.

Exception: Release of Class 1 Liquids and fire protection water directly into a sanitary or storm-water drainage system, onto the ground, or a combination thereof is permitted when in compliance with federal, state, and local governmental agencies' regulations and permits.

3803.6.2.2 Outdoor. Secondary containment for outdoor storage areas shall be in accordance with IFC Chapter 50, as amended.

3803.6.3 Occupant and property protection. Occupant and property protection shall be provided in accordance with Sections 3803.6.3.1 through 3803.6.3.4.

3803.6.3.1 Automatic sprinklers. An automatic sprinkler system shall be installed throughout ABPF H-2 and H-3 fire areas in accordance with Sections 3803.6.3.1.1 through 3803.6.3.1.3.

3803.6.3.1.1 Flammable liquids. Sprinkler discharge criteria for Class 1 Liquid use areas and storage areas in ABPFs or portions thereof shall be in accordance with NFPA 30 but shall not be less than that required in accordance with NFPA 13 for Ordinary Hazard Group 2 with a minimum design area of 3,000 square feet (279 m²).

Exception: H-2 and H-3 occupancies with storage of Class 1 Liquids in casks shall be protected by a sprinkler system designed for Extra Hazard 2 in accordance with NFPA 13, or by an approved engineered design.

3803.6.3.1.2 Combustible dust producing operations. Automatic sprinkler protection criteria for H-2/Combustible Dust Producing Operations shall be determined in accordance with Section 3803.2.1.1.

3803.6.3.1.3 Non-high hazard occupancies. Sprinkler discharge criteria for ABPFs or portions thereof not classified as a division of the high-hazard occupancy classification and where Class 1 Liquids are not present in quantities or conditions required to be regulated by NFPA 30 or this chapter, shall be in accordance with NFPA 13.

3803.6.3.2 Sprinkler system supervision and alarms. Automatic sprinkler systems shall be electrically supervised in accordance with IFC Section 903.4, as amended. Audible and visible occupant notification upon activation of water flow shall be provided in accordance with IFC Section 907.5, as amended, throughout all areas in ABPFs with automatic sprinkler protection.

3803.6.3.3 Emergency alarm. In addition to automatic sprinkler system flow detection and all fire safety functions required by other sections of this code, an approved manual fire alarm system in accordance with Sections 3803.6.3.3.1 through 3803.6.3.3.3 shall be provided in H-2 and H-3 occupancies in ABPFs.

3803.6.3.3.1 Initiation. Manual fire alarm boxes shall be installed in accordance with IFC Section 907.4.2 outside of each interior exit or exit access door in the fire barrier walls separating the H-2 or H-3 occupancies, and in the exterior walls surrounding the H-2 or H-3 occupancies.

Exception: On exterior walls of H-2 or H-3 occupancies, fire alarm boxes are permitted to be installed inside of each interior exit, exit access, or exit discharge door in the exterior wall.

Manual fire alarm boxes shall be installed at not more than 150-foot (45,720 mm) intervals along corridors, interior exit stairways or ramps, or exit passageways where Class 1 Liquids are transported.

3803.6.3.3.2 Notification. Emergency alarm audible and visible occupant notification shall be provided in accordance with IFC Section 907.5, as amended, throughout fire areas containing H-2 or H-3 occupancies.

3803.6.3.3.3 Annunciation. The emergency alarm system shall be monitored and annunciated as a separate zone at the Fire Alarm Control Panel (FACP). A separate emergency alarm panel is required when prescribed by other sections of the *International Building and Fire Code* for regulated hazards other than, or in addition to, Class 1 Liquids or combustible dust production in the manufacture of ethanol mixtures. When the emergency alarm system is activated, information shall be communicated to the supervising station that the zone in alarm contains flammable liquids or combustible dust, or both.

3803.6.3.4 Portable fire extinguishers. A minimum of one approved portable fire extinguisher complying with IFC Section 906, as amended, and having a rating of not less than 20-B shall be located not less than 10 feet (3048 mm) or more than 50 feet (15 240 mm) from any Class 1 Liquid storage area or use area or combustible dust production area.

3803.6.4 Electrical. Electrical wiring, equipment and systems shall be installed and maintained in ABPFs in accordance with NFPA 70 (NEC) and IFC Section 605 and Sections 3803.6.4.1 through 3803.6.4.4.

3803.6.4.1 Classified electrical equipment. Classified electrical equipment per NFPA 70 (NEC) shall be installed in accordance with IFC Section 5703.1.1 in areas of ABPFs or portions thereof where it cannot be justified to the fire and building code official during design review, and subsequently demonstrated to the fire code official on annual inspections, that an atmospheric concentration at or below 25 percent of the LFL or MEC can be maintained.

A classified area shall not be required to extend beyond an unpierced floor, roof or other solid partition that prevents the migration of liquids, vapors and dust.

3803.6.4.1.1 Stills. Electrical equipment attached to or part of stills in H-2 or H-3 occupancies shall be Class 1, Division 1 in accordance with NFPA 70 (NEC).

3803.6.4.1.2 Electric motors. Electric motors located 8 feet (2438 mm) or less from any edge of equipment where Class 1 Liquid vapor/air mixtures could exist under normal operations and 3 feet (914 mm) or less above the floor or grade level within 25 feet (7620 mm) horizontally from any equipment with Class 1 Liquids shall be considered Class 1, Division 2 in accordance with NFPA 70 (NEC).

3803.6.4.1.3 Other applications. The fire code official is authorized to determine the extent of the Class 1 electrical equipment and wiring location when a condition is not specifically covered by this chapter, IFC Section 5703.1.1 or NFPA 70 (NEC).

3803.6.4.1.4 Industrial trucks. Powered industrial trucks used in areas designated as classified electrical locations in accordance with Section 3803.6.4.1 shall be listed and labeled for use in the intended environment in accordance with NFPA 505.

3803.6.4.2 Grounding. Equipment used for grain or Class 1 Liquids shall be electrically connected in accordance with NFPA 70 (NEC) and NFPA 77, and Sections 3803.6.4.2.1 and 3803.6.4.2.2 to prevent the accumulation of static electricity and sparking.

3803.6.4.2.1 Conveyance equipment. All conveyance equipment including that used for grain or Class 1 Liquid transfer and shall be electrically connected by bond wires, ground cables, piping or similar means to a static grounding system. Conveyor belts shall be electrically conductive and equipped with static eliminators.

Nozzles and vessels used for the transfer of Class 1 Liquids shall be electrically interconnected by:

1. Metallic floor plates on which vessels stand while filling, when such floor plates are electrically connected to the fill stem; or
2. Where the fill stem is bonded to the container during filling by means of a bond wire.

Exceptions:

1. Vats or casks without internal metal or plastic components that could hold a potential difference.
2. Equipment used in post bottling operations such as packaging and box storage shall be grounded in accordance with standards applicable to that equipment and industry practice.

3803.6.4.2.2 Storage equipment. Plastic and metal grain storage bins or silos and Class 1 Liquid stationary tanks that are drawn down and refilled on a regular basis or are otherwise subjected to processes that could create an electric potential difference and sparking, shall be grounded.

3803.6.4.3 Lightning protection. Lightning protection in accordance with NFPA 780 shall be provided on ABPFs with an H-2 occupancy; on miscellaneous structures with a combustible dust production hazard due to the storage, handling, or processing of grains; and on ABPFs with an H-2 occupancy and a still having a 750 gallon (2839L) or larger capacity, or aggregate bulk storage of Class I Flammable Liquids of 7,800 gallons (29,526L) or greater.

3803.6.4.4 Standby or emergency power. Where mechanical ventilation, treatment systems, limit controls, alarm, detection or other electrically operated systems are required, such systems shall be provided with an emergency or standby power system in accordance with NFPA 70 (NEC) and IFC Section 604.1, as amended.

Exception: Subject to the fire and building code officials, standby power for mechanical ventilation and limit control systems shall not be required where an approved fail-safe engineered system is installed.

3803.6.5 Location of stills and vessels. Stills and vessels in Class 1 Liquid use areas shall be located with respect to the lot lines of adjoining property which can be built on, in accordance with IFC Tables 5703.4(1) and 5703.4(2).

Exceptions:

1. Where the exterior wall facing the adjoining lot line is without openings, has a fire-resistance rating of not less than 2 hours, and the ABPF is protected throughout with an automatic sprinkler system in accordance with Section 3803.6.3.1, the fire and building code officials are authorized to reduce the minimum separation distances to not less than 1 foot (305 mm), or the minimum separation distances required by other provisions of the *International Building and Fire Code*, whichever is greater.
2. Where the capacity of the largest still or vessel within the minimum separation distance is 250 gallons (946 L) or less, the aggregate volume of all stills and vessels within the minimum separation distance is 750 gallons (2839 L) or less, the normal operating pressure of all vessels within the minimum separation distance is 2.5 psig (17.2 kPa) or less, and the ABPF is protected throughout with an automatic sprinkler system in accordance with Section 3803.6.3.1, the minimum separation distance to lot lines is permitted to be 1 foot (305 mm), or the minimum separation distances required by other provisions of the *International Building and Fire Code*, whichever is greater.

3803.6.6 Security. Class 1 Liquid use areas and storage areas shall be secured against unauthorized entry and safeguarded in a manner approved by the fire code official.

3803.6.7 Protection from vehicles. Bollards in accordance with IFC Section 312 or other approved means shall be provided to protect all vessels, stills, and piping which handle Class 1 Liquids and are subject to vehicular, including industrial truck, damage.

3803.6.8 Labeling and signage. When a permit is required in accordance with Section 105, visible hazard identification markings, labels, signs and placards shall be placed on vessels and process piping used for Class 1 Liquids, and in Class 1 Liquid storage areas, use areas and combustible dust production areas, and at the entrances thereto in accordance with applicable federal, state, and standards regulations, Sections 3803.6.8.1 through 3803.6.8.6, IFC Chapters 50 and 57, as amended, and NFPA 704, or as approved. Content shall be in English, symbols permitted by this code and referenced standards, or both. Placards shall be in accordance with NFPA 704. The fire code official is authorized to require additional signs and placards at specific entrances and locations. Markings, labels, signs, and placards shall not be obscured or removed.

Exception: Casks are not required to be labeled.

3803.6.8.1 Warning signs. Warning signs shall be of a durable material, have a yellow background with black or red text or symbols, and shall convey the danger being identified. Warning sign text shall not be less than 3 inches (76 mm) in height with a 5/8 inch (15 mm) stroke.

3803.6.8.2 Information signs. Information signs shall be of a durable material, have a blue background with white or red text or symbols, or a white background with blue text, and shall convey the information required. Information sign text shall not be less than 3 inches (76 mm) in height with a 5/8 inch (15 mm) stroke.

Exception: Where otherwise specified by applicable regulations or standards.

3803.6.8.3 Location. Placards shall be located in accordance with NFPA 704 and shall be provided on the outside of each interior exit or exit access door in the fire barrier walls

separating the H-2 or H-3 occupancies, and in the exterior walls surrounding the H-2 or H-3 occupancies.

3803.6.8.4 Piping. Piping and tubing conveying Class 1, 2, or 3 flammable or combustible liquids between vessels including heat transfer fluids shall be identified in accordance with ASME A13.1 to indicate the material conveyed.

3803.6.8.5 Individual containers, packages and cartons. Individual containers, intermediate bulk containers, packages and cartons shall be conspicuously identified in accordance with federal regulations and applicable state laws.

3803.6.8.6 Tank marking. Every tank shall bear a permanent nameplate or marking indicating the standard used as the basis of design. Stationary tanks more than 100 gallons (379 L) in capacity used for the storage of Class 1 Liquids shall bear a warning sign and placard in accordance with Section 3803.6.8 corresponding to the material therein.

Exception: Vats.

3803.6.9 Sources of ignition. Control of sources of ignition shall be in accordance with Sections 3803.6.8.1 and 3803.6.8.2.

3803.6.9.1 Smoking. Smoking areas shall be in accordance with IFC Section 310 and shall be prohibited in Class 1 Liquid storage areas or use areas and in combustible dust production areas. "No Smoking" warning signs in accordance with IFC Sections 310.3 shall be provided in such areas and at all entrances to them.

Exception: Where designated smoking areas within ABPFs are permitted. Designated smoking areas shall be separated from Class 1 Liquid storage areas and use areas and combustible dust production areas by a minimum of 25 feet (7620 mm) and shall be clearly identified with information signs in accordance with Section 3803.6.8.

3803.6.9.2 Open flames. Open flames including barrel charring operations, and devices operating at temperatures above 680 °F (360 °C) are prohibited throughout fire areas containing Class 1 Liquid storage areas or use areas or combustible dust production areas.

Exceptions:

1. Areas designated as smoking.
2. Areas where hot work permits have been issued in accordance with this Section 105.
3. Listed and labeled gas fired or electric unit heaters installed in accordance with the *International Mechanical Code*, *International Fuel Gas Code* and *NFPA 70 (NEC)*, located more than eight feet (2438 mm) from any edge of equipment where Class 1 Liquid vapor/air mixtures could exist under normal operations and more than three feet (914 mm) above the floor or grade level within 25 feet (7620 mm) horizontally from any equipment with Class 1 Liquids.

3803.6.10 Separation of incompatible materials. Incompatible materials shall be separated in accordance with IFC Section 5003.9.8.

3803.6.11 Seismic protection. All equipment in ABPFs including machinery, racks, piping, and stationary tanks shall be braced and anchored in accordance with the seismic design

requirements of the International Building Code for the seismic zone in which the ABPF is located.

3803.6.12 Protection from corrosion. Machinery, piping, tank, process vessel, and container materials exposed to Class 1 Liquids shall be protected in accordance with Sections 3803.6.12.1 and 3803.6.12.2.

3803.6.12.1 Protection from external corrosion and galvanic action. Where subject to external corrosion or galvanic action, machinery, piping, tank, process vessel, and container holding or conveying Class 1 Liquids shall be fabricated from noncorrosive materials or provided with corrosion protection. Dissimilar metallic parts subject to galvanic action shall not be joined.

3803.6.12.2 Chemical protection. Machinery, piping, tank, process vessel, and container materials used for Class 1 Liquids shall be protected from all chemicals to which they are exposed including ethanol. Clean-in-place (CIPs) fittings shall be compatible with the cleaning agents used on the vessels and piping to which they are attached. Tank lining shall be in accordance with Section 3804.1.2.6.

3803.6.13 Limit controls. Limit controls shall be provided in accordance with Sections 3803.6.13.1 through 3803.6.13.3.

3803.6.13.1 Pressure control. Machinery, piping, tanks, vessels, and stills containing or conveying Class 1 Liquids shall be designed for the pressures they will be subjected to in accordance with applicable standards. Machinery, piping, tanks, containers, processing vessels, and stills containing or conveying Class 1 Liquids that can generate pressures exceeding design limits because of exposure fires or internal reaction shall have an approved means to relieve excessive positive and negative internal pressure. Vents provided to relieve excessive positive pressure shall discharge to an approved location.

3803.6.13.2 High-liquid-level control. Stationary tanks and process vessels with Class 1 Liquids having a capacity greater than 500 gallons (1893 L) shall be equipped with a device or other means to prevent overflow into the building including, but not limited to a float valve, preset meter on the fill line, valve actuated by the weight of the tank's contents, low-head pump incapable of producing overflow, or a liquid-tight overflow pipe at least one pipe size larger than the fill pipe and discharging by gravity back to an approved location.

Exception Liquid-level sight gauges or other manual means approved by the fire code official to determine fill level are permitted in ABPFs where the use area or storage area is small enough that the stationary tank or process vessel is effectively under constant observation during filling operations.

3803.6.13.3 Low-liquid-level control. Approved safeguards shall be provided to prevent a low-liquid level in stationary tanks, processing vessels and stills from creating a hazardous condition, including but not limited to overheating.

3803.6.14 Handling and transportation. Containers, portable tanks, and casks holding more than 5 gallons (19 L) of Class 1 Liquids being transported in a corridor or enclosed exit shall be on a cart or truck in accordance with IFC Sections 5003.10.2 and 5003.10.3.

**SECTION 3804
EQUIPMENT**

3804.1 General. Equipment utilized for the production, storage, dispensing, blending or handling of Class 1 Liquids shall be listed or approved and shall be in accordance with Sections 3804.1.1 through 3804.1.4.4.2.

3804.1.1 Piping systems. Piping systems for conveying Class 1 Liquids including piping, tubing, valves, pumps, and fittings shall be designed, installed, and maintained in accordance with Sections 3804.1.1.1 through 3804.1. 1.7, IFC Section 5703.6, as amended, and ASME B31. The use of other standards is permitted when approved.

3804.1.1.1 Component design and construction. Piping, tubing, hoses, valves, fittings and related components conveying Class 1 Liquids shall be in accordance with the following:

1. Piping, tubing, hoses, valves, pumps, fittings and related components shall be designed and fabricated from materials of adequate strength and durability to withstand the structural and environmental conditions to which they are subjected.
2. Piping, tubing, hoses, valves, pumps, fittings and related components used in liquid transfer operations shall be approved or listed for the intended use.
3. Where provided, in-line flame arresters in piping systems shall be installed and maintained in accordance with their listing or API 2028.
4. Where Class 1 Liquids are carried in piping pressurized above 15 pounds per square inch gauge (psig; 103 kPa), an approved means of leak detection shall be provided.

Exception: Piping for overpressure relief devices.

3804.1.1.2 Piping supports. Piping systems shall be substantially supported and protected against physical damage and excessive stresses arising from seismic activity, settlement, vibration, expansion and contraction. Piping supports shall be protected against exposure to fire by:

1. Draining spilled liquid away from the piping support system at a minimum slope of not less than 2 percent;
2. Providing protection with a fire-resistance rating of not less than 2 hours; or
3. Other approved methods.

3804.1.1.3 Pipe joints. Pipe joints shall be in accordance with IFC Sections 5703.6.9 and 5703.6.10.

Exception: Where located in concealed spaces within buildings, joints in piping systems used to convey Class 1 liquids shall be welded.

3804.1.1.4 Valves. Piping systems with and without pumps shall contain a sufficient number of manual-control, auto-control, and check valves to protect the ABPF and properly control the flow of Class 1 Liquids; in normal operation, in the event of physical damage, or the condition of fire exposure, and shall be in accordance with the following:

1. Readily accessible manual valves, automatic remotely-activated fail-safe emergency shutoff valves, or excess flow control shall be installed on gravity-fed supply piping

and tubing and in systems pressurized above 15 pounds per square inch gauge (psig; 103 kPa) as close to the source as practical.

2. Manual emergency shutoff valves and controls for remotely activated emergency shutoff valves shall be clearly visible and readily accessible. Information signage in accordance with IBC Section 3803.6.8 shall be provided identifying the emergency shutoff valves and controls.
3. Backflow prevention or check valves shall be provided when backflow could create a hazardous condition or cause an unauthorized discharge.

3804.1.1.5 Pumps. Solid or liquid fueled pumps are not permitted in Class 1 Liquid use areas or storage areas.

Exception: Fire pumps separated from the Class 1 Liquid use areas and storage areas by 2-hour fire-resistance rated fire barriers in accordance with IBC Section 707.

Positive-displacement pumps shall be provided with pressure relief discharging back to the vessel, pump suction or other approved location, or shall be provided with interlocks to prevent over-pressure.

3804.1.1.6 Pressurized transfer systems. Gases introduced to provide for transfer of Class 1 Liquids shall be inert. Controls, including pressure relief devices, shall be provided to limit the pressure so the maximum working pressure of vessels cannot be exceeded. Where devices operating through pressure within a tank, intermediate bulk container, or container are utilized, the tank, intermediate bulk container, or container shall be a pressure vessel approved for the intended use.

3804.1.1.7 Maintenance. Piping and appurtenances shall be maintained in a safe operating condition and in accordance with their applicable listings and standards. Damage to piping or appurtenances shall be repaired using materials having equal or greater strength and fire resistance or the equipment shall be replaced, taken out of service, repaired or disposed of in an approved manner. The repair, alteration or reconstruction, including welding, cutting and hot tapping of piping that has been placed in service, shall be in accordance with NFPA 30.

3804.1.2 Vessels. The design and construction of vessels used in ABPFs for Class 1 Liquids shall comply with the applicable Sections 3804.1.2.1 through 3804.1.2.13.4 and NFPA 30, or shall be of an approved type. Pressure vessels shall comply with the *ASME Boiler and Pressure Vessel Code*.

3804.1.2.1 Underground storage of Class 1 Liquids. Underground storage of Class I liquids in tanks shall comply with IFC Chapters 50 and 57, as amended. Vaults shall be in accordance with IFC Chapter 57, as amended. Underground storage of Class I liquids in other vessels is prohibited.

3804.1.2.2 Outdoor storage of Class 1 Liquids. Outdoor storage shall be in accordance with IFC Chapters 50 and 57, as amended.

3804.1.2.3 Tank vehicles and tank cars. Tank vehicles and tank cars shall not be used as storage or processing vessels.

3804.1.2.4 Design of supports. The supporting structure for stationary tanks and portable tanks with capacity greater than 660 gallon (2498 L) shall be designed in accordance with the International Building Code and NFPA 30.

3804.1.2.5 Locations subject to flooding. Where a portable tank or intermediate bulk container with capacity in excess of 660 gallons (2498 L), or a stationary tank is located in an area where it is subject to a rise in the water table, flooding or accumulation of water from fire suppression operations, uplift protection shall be provided in accordance with NFPA 30, Sections 22.14 and 23.14.

3804.1.2.6 Tank lining. Steel stationary tanks and steel portable tanks with capacity greater than 660 gallon (2498 L) are permitted to be lined only for the purpose of protecting the interior from corrosion or providing compatibility with a material to be stored. Only those liquids tested for compatibility with the lining material are permitted to be stored in lined tanks.

3804.1.2.7 Manual drainage. Manual drainage control valves shall be provided on stationary tanks and portable tanks with capacity greater than 660 gallon (2498 L). Manual drainage control valves on stationary tanks shall be located at approved locations remote from the tanks to ensure their operation in a fire condition.

3804.1.2.8 Connections. Filling and emptying connections to vessels shall be provided with liquid-tight caps, covers, plugs, or valves which shall be closed when not in use.

Connections located below normal Class 1 Liquid levels in stationary tanks with capacity of 500 gallons (1893 L) or more shall be provided with internal or external isolation valves located as close as practical to the shell of the tank.

3804.1.2.9 Materials used in tank construction. The materials used in tank construction shall be in accordance with NFPA 30.

3804.1.2.10 Separation between adjacent tanks. The separation between stationary tanks containing Class 1 Liquids shall be in accordance with NFPA 30, Table 22.4.2.1.

Exceptions:

1. Where a group of no more than 4 stationary tanks are aligned in a single row, the minimum separation distance between tanks is permitted to be reduced to 18" (457 mm) provided no single tank is over 960 gallons (3634 L) and clear access of 3 feet (914 mm) is provided around the group.
2. Where stationary tanks are in the drainage path of Class 1 Liquids, and are compacted in three or more rows or in an irregular pattern, the fire code official is authorized to require greater separation than specified in NFPA 30, Table 22.4.2.1 or other means to make tanks in the interior of the pattern accessible for emergency response including firefighting purposes.

3804.1.2.11 Maintenance. Vessels and their appurtenances shall be maintained in a safe operating condition in accordance with their listings, applicable standards, and industry practice. Damage and malfunctions shall be repaired using materials having equal or greater strength and fire resistance. Vessels leaking Class 1 Liquids shall be promptly emptied, repaired and returned to service. Stationary tanks not returned to service shall be abandoned in accordance with Section 5704.2.13, or removed in accordance with IFC Section 5704.2.14.

3804.1.2.12 Vent lines. Portable tanks with a storage capacity of 660 gallons (2498 L) or more and stationary tanks shall be provided with normal and emergency vents in accordance with Sections 3804.1.2.12.1 through 3804.1.2.12.5 to relieve positive and negative pressures such as those created from filling and draining.

Vent lines shall not be used for purposes other than venting unless approved.

3804.1.2.12.1 Installation of vent piping. Vent pipes shall be designed, sized, constructed and installed in accordance with IFC Sections 5703.6, as amended, 5704.2.7.3 and 5704.2.7.4. Vent pipes shall be installed to drain toward the tank without sags or traps in which liquid can collect. Vent pipes shall be protected from physical damage and vibration.

3804.1.2.12.2 Vent-line flame arresters and pressure-vacuum vents. Normal vents shall be equipped with vent-line flame arresters and pressure-vacuum vents in accordance with IFC Section 5704.2.7.3.2.

3804.1.2.12.3 Vent pipe outlets. To facilitate atmospheric dispersion, vent outlets shall be located so vapors are released at a safe point outside of buildings, directed upward or horizontally away from adjacent walls so vapors will not be trapped by eaves or other obstructions. Vent outlets shall not be less than 12 feet (3658 mm) above the finished ground level and shall not be less than 5 feet (1524 mm) from building openings or lot lines of properties that can be built upon.

3804.1.2.12.4 Manifolding. Subject to the approval of the fire code official, vent pipes are permitted to be manifolded only for special purposes such as vapor recovery, vapor conservation or air pollution control. Manifolded vent pipes shall be adequately sized to prevent system pressure limits from being exceeded when manifolded tanks are subject to the same fire exposure.

3804.1.2.12.5 Emergency venting. Tanks shall be equipped with additional venting that will relieve rapid overpressure due to fire. Emergency vents shall not discharge inside buildings. The venting shall be installed and maintained in accordance with NFPA 30, 22.7.

3804.1.2.13 Vessel openings other than vents. Vessel openings other than vents shall comply with Sections 3804.1.2.13.1 through 3804.1.2.13.4

3804.1.2.13.1 Filling and emptying connections. Filling and emptying connections to stationary tanks shall be properly identified in accordance with Section 3803.6.8.

3804.1.2.13.2 Fill pipes and discharge lines. For top-loaded stationary tanks and portable tanks with capacity greater than 660 gallons (2498 L), a metallic fill pipe shall be designed and installed to minimize the generation of static electricity by terminating the pipe within 6 inches (152 mm) of the bottom of the tank. It shall be installed in a manner which avoids excessive vibration.

3804.1.2.13.3 Manual gauging. Vessel openings for manual gauging, if independent of the fill pipe, shall be provided with a liquid-tight cap, cover, or plug. Covers shall be kept closed when not gauging. Such openings shall be protected against liquid overflow and possible vapor release by means of a spring-loaded check valve or other approved device.

3804.1.2.13.4 Protection against vapor release. Tank openings provided for purposes of vapor recovery shall be protected against possible vapor release by means of a spring-loaded check valve or dry-break connection, or other approved vapor-tight device. Openings designed for combined fill and vapor recovery shall be protected against vapor release.

Exceptions:

1. Where the opening is a pipe connected to a vapor processing system.
2. Where connection of the liquid delivery line to the fill pipe simultaneously connects the vapor recovery line.

3804.1.3 Stairs, platforms and walkways. Stairs, platforms and walkways installed to facilitate access to vessels, storage, pipes, and process equipment shall be noncombustible, designed, and constructed in accordance with NFPA 30 and the International Building Code.

3804.1.4 Testing. Equipment, devices and systems shall be tested in accordance with Sections 3804.1.4.1 through 3804.1.4.4.2.

3804.1.4.1 Piping systems. Before being covered, enclosed or placed in use, piping shall be hydrostatically tested to 150 percent of the maximum anticipated pressure of the system, or pneumatically tested to 110 percent of the maximum anticipated pressure of the system, but not less than 5 pounds per square inch gauge (psig; 34.5 kPa) at the highest point of the system. This test shall be maintained for a sufficient time period to complete visual inspection of joints and connections. For a minimum of 10 minutes, there shall be no leakage or permanent distortion. Storage tanks shall be tested independently from the piping.

Exception: Piping tested in accordance with the applicable section of ASME B31.9.

3804.1.4.1.1 Existing piping. Existing piping shall be tested in accordance with this section when the fire code official has reasonable cause to believe a leak exists. Piping used for Class 1 Liquids shall not be tested pneumatically.

Exception: Vapor-recovery piping is permitted to be tested using an inert gas.

3804.1.4.2 Tanks. Prior to being placed into service, tanks shall be tested in accordance with NFPA 30, 21.5.

3804.1.4.3 Safety systems. Automatic sprinkler systems, automatic sprinkler system monitoring, fire alarm systems, all limit controls, and all other fire- and life-safety systems shall pass the commissioning or acceptance tests in accordance with their respective design, installation, and testing standards prior to occupancy and use of the facility. Emergency alarms and limit-control monitoring shall be tested as for fire alarm systems in accordance with NFPA 72.

3804.1.4.4 Periodic testing. Equipment and safety systems shall be periodically tested in accordance with Sections 3804.1.4.4.1 and 3804.1.4.4.2. Written records of the tests conducted or maintenance performed shall be maintained in accordance with the provisions of Section 107.

Exceptions:

1. Periodic testing shall not be required when approved written documentation is provided substantiating testing will damage the equipment, device or system and the equipment, device or system is maintained as specified by the respective manufacturer.

ALCOHOL BEVERAGE PRODUCTION FACILITIES

2. Periodic testing shall not be required when the equipment and systems are utilized routinely as part of normal operations and maintained in good operating condition.
3. Periodic testing shall not be required for equipment, devices and systems that fail in a fail-safe manner.
4. Periodic testing shall not be required for equipment, devices and systems that self- diagnose and report trouble. Records of the self-diagnosis and trouble reporting shall be made available to the fire code official.
5. Periodic testing shall not be required if system activation occurs during the required test cycle for the components activated during the test cycle.
6. Approved maintenance in accordance with IFC Section 5003.6 that is performed not less than annually or in accordance with an approved schedule shall be permitted to meet the testing requirements set forth in IFC Sections 5003.2.9.1 and 5003.2.9.2.

3804.1.4.4.1 Equipment. The following equipment shall be tested periodically:

1. Piping
2. Limit controls required by Section 3803.6.13

3804.1.4.4.1.1 Testing frequency. The equipment listed in Section 3804.1.4.4.1 shall be tested at one of the frequencies listed below:

1. Not less than annually;
2. In accordance with the approved manufacturer's requirements;
3. In accordance with approved recognized industry standards; or
4. In accordance with an approved schedule.

3804.1.4.4.2 Safety systems. Safety systems listed in Section 3804.1.4.3 shall be periodically tested in accordance with their design, installation and testing standards.

Emergency alarms and limit-control monitoring shall be tested as for fire alarm systems in accordance with NFPA 72.

3804.2 Storage and use areas. Storage and process operations shall be in accordance with the *International Building and Fire Code* and Sections 3804.2.1 through 3804.2.3.3.

3804.2.1 Storage areas. Storage of Class 1 Liquids shall be in accordance with Sections 3804.2.1.1 through 3804.2.1.4, IFC Chapter 32, as amended, and NFPA 30.

3804.2.1.1 General. Storage of vessels in closely packed piles, on pallets, in racks, or on shelves shall be in accordance with Sections 3804.2.1.1.1 through 3804.2.1.1.3.

3804.2.1.1.1 Basement storage. Storage in excess of the MAQs is prohibited in basements.

3804.2.1.1.2 Limited combustible storage. Limited quantities of class 1 through 4 commodities are permitted to be stored in the same non-separated area, room, or building as Class 1 Liquids provided the combustibles, other than those used for packaging the Class 1 Liquids, are separated from the Class 1 Liquids in storage by a

minimum of 8 feet (2438 mm) horizontally either by open aisles, open racks, or racks filled with noncombustible commodities.

3804.2.1.1.3 Shelf storage. Shelving shall be of substantial construction, and shall be braced and anchored in accordance with the seismic design requirements of the International Building Code for the seismic zone in which the ABPF is located. Shelving, chocks, scuff boards, floor overlay and similar installations shall be of noncombustible construction or of wood not less than a 1-inch (25 mm) nominal thickness; treatments, coatings and construction materials shall be compatible with ethanol. Shelves shall be provided with a lip or guard when used for the storage of individual containers or casks.

Exception: Storage in flammable liquid storage cabinets specifically designed for such use.

3804.2.1.1.4 Separation and aisles. Aisles shall be provided in storage areas such that all storage vessels are located no more than 20 feet (6096 mm) horizontally from a main aisle or access aisle. Main aisles shall be a minimum of 8 feet (2438 mm) wide in high piled combustible storage areas and a minimum of 4 feet wide in non-high piled combustible storage areas. Access aisles shall be a minimum of 4 feet (1219 mm) wide in high piled combustible storage areas and a minimum of 44 inches (1118 mm) wide in non-high piled combustible storage areas. Aisles utilized for manual stocking, separation between piles, separation between adjacent rows of racks, and separation between racks and adjacent pile storage shall be main aisles or access aisles. Aisles utilized for mechanical stocking shall be main aisles. All piles including palletized storage shall border a main aisle on a minimum of one side or end. Additional aisles shall be provided for access to doors, required windows and ventilation openings, standpipe connections, fire extinguishers, mechanical equipment and switches. Such aisles shall be a minimum of 3 feet (914 mm) in width. A single aisle is permitted to serve multiple functions provided its minimum width is the largest of the widths required for the functions served.

3804.2.1.1.5 Material handling equipment. Material handling equipment shall be suitable to manipulate vessels at the highest tier level.

3804.2.1.1.6 Housekeeping. Storage shall be maintained in an orderly manner.

3804.2.1.1.7 Dunnage, scuff boards, floor overlay. Dunnage, scuff boards, floor overlay and similar installations shall be of noncombustible construction or of wood not less than a 1-inch (25 mm) nominal thickness.

3804.2.1.1.8 High piled combustible storage. Storage of vessels in closely packed piles, on pallets, in racks, or on shelves, where the top of storage is greater than 6 feet (1829 mm) in height, shall be considered high piled combustible storage. Where applicable requirements in IFC Chapter 32, as amended, are in conflict with those in Section 3804.2.1, the more restrictive shall govern.

3804.2.1.3 Pile storage. Pile storage including palletized storage shall be in accordance with Sections 3804.2.1.3.1 through 3804.2.1.3.2.2.

3804.2.1.3.1 Stabilizing and supports. Intermediate bulk containers, containers, and portable tanks shall be stored in accordance with NFPA 30. Horizontally oriented casks stored in piles shall be supported by stackable racks or cradles of substantial construction designed for that purpose. Lateral bracing shall be provided for horizontally oriented casks stored in piles where the height of the pile exceeds three times the least dimension of the

base rack or cradle. Storage height of horizontally oriented casks in this configuration shall not exceed the lesser of the rack manufacturer's recommendations or industry standards.

Exception: Where an approved engineering analysis is submitted demonstrating taller storage configurations are stable against overturning in accordance with the seismic design requirements of the International Building Code for the seismic zone in which the ABPF is located.

3804.2.1.3.2 Palletized storage. Palletized storage shall be in accordance with Sections 3804.2.1.3.2.1 and 3804.2.1.3.2.2.

3804.2.1.3.2.1 Stabilizing and supports. Casks stacked vertically for storage shall be separated by pallets or other dunnage that spreads the weight of the casks on the tier above over the casks on the tier below. A lower tier shall not have less than four casks and shall not have an empty cask when a tier above has a cask that is not empty. No more than two tiers of casks are permitted to be stacked vertically in this configuration.

Exceptions:

1. Where the collapse strength of the casks on the lowest tier is not exceeded, palletized storage of vertically oriented casks are permitted to be stacked to a height of four tiers where the casks are bound together in a square pattern groups of no less than four, by a steel band or other approved binding.
2. Where the collapse strength of the casks on the lowest tier is not exceeded, palletized storage of vertically oriented casks are permitted to be stacked to a height of six tiers where the casks are bound together in a square pattern in groups of no less than nine, by a steel band or other approved binding.
3. Where the collapse strength of the casks on the lowest tier is not exceeded, an engineered overturning analysis shall be provided demonstrating stability in accordance with the seismic design requirements of the International Building Code for the seismic zone in which the ABPF is located for storage configurations other than permitted in Exceptions 1 and 2.

3804.2.1.3.2.2 Idle combustible pallets. Storage of idle wood pallets shall be limited to a maximum pile size of 2,500 square feet (232 m²) and to a maximum storage height of 6 feet (1829 mm). Storage of idle plastic pallets shall be in accordance with IFC Section 3206.4.1.1 and as limited by the capacity of the automatic sprinkler system in accordance with NFPA 13. Pallet storage shall be separated from liquid storage by aisles that are a minimum of 8 feet (2438 mm) wide.

3804.2.1.4 Portable tank, intermediate bulk container, and container storage. Portable tanks and intermediate bulk containers stored over one tier in height shall be designed to nest securely without dunnage. Stacked containers shall be separated by pallets or dunnage to provide stability and to prevent excessive stress to container walls. The storage height and configuration shall be in accordance with NFPA 30.

3804.2.2 Grain storage. Grain storage shall be in accordance with Section 3803.2.1.1.

3804.2.3 Use areas. Use areas for Class 1 Liquids in amounts exceeding the MAQ shall be in accordance with Sections 3804.2.3.1 through 3804.2.3.3.

3804.2.3.1 General. Systems shall be suitable for the use intended and shall be designed by persons competent in such design. Controls shall be designed to prevent materials from entering or leaving the process or reaction system at other than the intended time, rate or path. Where failure of an automatic control could result in a dangerous condition or reaction, the automatic control shall be fail-safe. Use areas with Class 1 Liquids in excess of the MAQs are prohibited in basements.

3804.2.3.2 Non-listed appliances. Stills where internal operating vapor pressures normally exceed 2.5 psig (103.4 kPa) or could potentially exceed 2.5 psig (103.4 kPa) due to failures in operating methods such as clogged head packing or other materials held on column plates shall be provided with a listed pressure relief valve piped to discharge to the exterior in an approved location.

Exception: Stills listed for operation above 2.5 psig (103.4 kPa) and, where approved, stills constructed in accordance with the *ASME Boiler and Pressure Vessel Code*.

3804.2.3.3 Class 1 Liquid transfer. Class 1 liquids shall be transferred by one of the following methods:

1. From safety cans in accordance with NFPA 30.
2. Through an approved closed piping system.
3. From vessels by an approved pump taking suction through an opening in the top of the vessel.
4. By gravity from a tank, intermediate bulk container, or container through an approved self-closing or automatic-closing valve.
5. Approved engineered liquid transfer systems.

Exception: Liquids transferred into and from containers not exceeding a 5.3-gallon (20 L) capacity.

CHAPTER 39 MARIJUANA OPERATIONS is added as follows:

CHAPTER 39 MARIJUANA OPERATIONS

SECTION 3901 GENERAL

3901.1 Scope. This section shall apply to all occupancies engaging in marijuana (i.e. cannabis and extract derivatives) sales locations, growing, processing, extraction, and/or testing. These occupancies shall comply with this chapter and other applicable provisions of this Code.

3901.2 Permits. Permits shall be required as set forth in Section 105.

3901.3 Existing Operations. Buildings containing existing growing or extraction operations shall comply with this code by **July 1, 2018**.

SECTION 3902 DEFINITIONS

3902.1 Definitions. The following terms are defined in Chapter 2.

CHEMICAL FUME HOOD
EXTRACTION
POST OIL PROCESSING

SECTION 3903 EXTRACTION OPERATIONS

3903.1 Construction Requirements.

3903.1.1 Location. Extraction processes shall be performed in a room dedicated to the extraction process.

3903.1.2 Egress. Exit doors from the extraction room shall swing in the direction of egress and be provided with panic hardware where hazardous materials are used in the extraction process.

3903.1.3 Extraction Rooms. Extraction room shall be fully enclosed. The floor, ceiling, and walls of extraction rooms shall be constructed in accordance with the 2015 *International Building Code* and be continuous, non-combustible, and smooth. Rooms designed in accordance with Section 3903.4.1.1 shall be constructed to permit the free passage of exhaust air from all parts of the room.

Exception: Enclosed booths constructed in accordance with IFC Sections 2404.3.2.1 through 2404.3.2.3.

3903.1.4 Penetrations. Openings and penetrations into extraction rooms shall only be provided for egress, mechanical, electrical, or plumbing systems serving the extraction room. Penetrations shall be

sealed vapor tight. Non-operable glazing is permitted where glazing does not interfere with required exhaust systems.

3903.1.5 Extraction room illumination. Luminaires inside the extraction room shall comply with Section 3903.2.2. Luminaires attached to the walls or ceilings of an extraction room or booth, but outside of any classified area and separated from the flammable vapor areas by vapor-tight glass panels, shall be suitable for use in ordinary hazard locations. Such luminaires shall be serviced from outside the flammable vapor areas.

3903.1.6 Fire protection. Extraction rooms, booths, or hoods, including ductwork where required for hazardous exhaust systems, shall be protected by an approved automatic fire extinguishing system complying with Chapter 9 where any of the following exist:

- 1) Extraction processes utilizing LPG or off gassing LPG from spent plant material or oil
- 2) Vapors are released exceeding 25% of the lower flammable limit from flammable liquid extraction processes or flammable liquid post oil processing.

3903.2 Sources of ignition. Extraction or post oil processing operations which use flammable liquids or liquefied petroleum gas (LPG) shall comply with Sections 3903.2.1 through 3903.2.3

3903.2.1 Open flame and sparks. Smoking, open flames, direct fired heating devices, etc. shall be prohibited in areas where flammable vapors exist.

3903.2.2 Electrical equipment. Electrical equipment installed in rooms designed in accordance with Section 3903.4.1.1, hoods, or booths containing LPG extraction processes shall be in accordance with NFPA 70 (NEC) as a Class I Division I location. Areas adjacent to classified locations shall be in accordance with NFPA 70 (NEC). Electrical equipment installed in areas of flammable liquid extractions or post oil processing shall be in accordance with IFC Chapter 50, as amended, and NFPA 70 (NEC).

Exception: Subject to approval of the fire code official, rooms or booths containing LPG extraction equipment that is not normally opened within the room or booth for oil or plant material retrieval, and frequent leakage in the closed system does not occur, may be considered a Class I Division II location.

3903.2.3 Grounding and Bonding. Precautions shall be taken within LPG extraction rooms to minimize the possibility of ignition by static electrical sparks through static bonding and grounding of extraction equipment, ducts, and piping etc. installed in accordance with NFPA 70 (NEC).

3903.3 Equipment. Extraction process equipment utilizing hazardous materials shall be listed or approved.

3903.4 Exhaust required. Extraction and post oil processing, utilizing LPG or flammable liquids shall be provided with an exhaust system in accordance with Section 3903.4.1 or 3903.4.2. The exhaust system shall be in operation at all times when extractions or post oil processing is being performed and until LPG is off gassed from oil and/or plant material removed from LPG extraction equipment. Fans shall be of the type approved for use when flammable or explosive vapors are present in accordance with the 2015 *International Mechanical Code*, Section 503.

MARIJUANA OPERATIONS

3903.4.1 Exhaust for LPG extraction processes. A hazardous exhaust system engineered in accordance with the 2015 *International Building and Fire Code* shall be provided for LPG extraction processes including LPG degassing from processed plant material or oil removed from extraction equipment.

3903.4.1.1 Exhausted Enclosure. Where the extraction room is used as the exhausted enclosure, the exhaust system shall be designed to provide air movement across all portions of the floor to prevent the accumulation of vapors; the bottom of exhaust registers shall not be located more than six inches above the floor.

3903.4.1.2 Electrical Interlocks. The exhaust system shall be interlocked with the room power, such that when the exhaust system is not operating, power and lighting will be disabled.

3903.4.2 Exhaust for Flammable Liquid Extraction processes. A hazardous exhaust system in accordance with the 2015 *International Building and Fire Code* shall be provided for flammable liquid extraction processes.

Exceptions:

1. Distillation process with less than 5 gallons of flammable liquid performed under a chemical fume hood installed in accordance with the 2015 *International Building and Fire Code* unless a hazardous exhaust system is required by the 2015 *International Building and Fire Code*.
2. Solvent distillation units in compliance with IFC Section 5705.4
3. Extractions performed in accordance with Denver Ordinance No. 629-14, § 1, 11-10-14

3903.5 Gas Detection. A continuous gas detection system shall be provided within rooms containing CO₂ or LPG extraction processes. Actuation of the gas detection shall initiate a local alarm within the room. CO₂ gas detection systems shall alarm at 5000ppm. LPG gas detection systems shall alarm at 10% of the LFL. Portable LPG gas detection shall be utilized by the extraction system operator to verify local hydrocarbon levels, including system leaks.

3903.6 CO₂ Extraction Equipment Process discharge. CO₂ discharges shall be piped to the exterior.

3903.7 Refrigeration and Cooling Equipment. Refrigerators, freezers, and other cooling equipment used to store or process flammable liquids shall be in accordance with NFPA 45 and applicable provisions of the 2015 *International Building and Fire Code*.

SECTION 3904 MARIJUANA GROWING OPERATIONS

3904.1 CO₂ Enrichment Systems. CO₂ enrichment systems shall comply with Sections 5310 or 5311.

CHAPTER 50

HAZARDOUS MATERIALS—GENERAL PROVISIONS

SECTION 5001 **GENERAL**

Section 5001.1 Scope is amended by replacing Exception 10 and adding Exceptions 12 and 13 as follows:

10. The manufacture, storage, dispensing, and use of alcoholic beverages with 16% or less alcohol by volume and the remainder of the beverage not being flammable shall not be limited.
11. To remain.
12. The manufacture, storage, dispensing, and use of alcoholic beverages not meeting the criteria of Exception 10, shall be in accordance with IFC Chapter 38.
13. Battery powered industrial trucks regulated by Section 309.

Section 5001.3 Performance-based design alternative is replaced as follows:

5001.3 Performance-based design alternative. When approved by the Fire Code Official, buildings and facilities where hazardous materials are stored, used or handled shall be permitted to comply with this section as an alternative to compliance with the other requirements set forth in this Section and IFC Chapters 51 through 67, as amended. Written approval shall be obtained from the fire and building code officials prior to submitting a performance-based design.

Section 5001.5.2.1 Preparation is added as follows:

5001.5.2.1 Preparation. The Fire Code Official is authorized to require HMIS submittals to be prepared by a qualified individual or firm acceptable to the Fire Code Official in accordance with Section 104.

Section 5001.7 Laboratories using chemicals is added as follows:

5001.7 Laboratories using chemicals. Laboratory buildings, laboratory units, and laboratory work areas in which chemicals are handled or stored shall be in accordance with NFPA 45 and this code.

SECTION 5002 **DEFINITIONS**

Section 5002.1 Definitions is amended as follows:

5002.1 Definitions. The following terms are defined in Chapter 2:

BIOHAZARD

CARCINOGEN

OTHER HEALTH HAZARD MATERIAL

RADIOACTIVE MATERIAL

RELEASE/UNAUTHORIZED DISCHARGE

SENSITIZER

SECTION 5003 GENERAL REQUIREMENTS

Section 5003.4 Material Safety Data Sheets is replaced as follows:

5003.4 Material Safety Data Sheets. Material Safety Data Sheets (MSDS) shall be readily available on the premises (hard copy shall always be required) for hazardous materials regulated by this chapter. Material Safety Data Sheets shall be located at the main entrance or a location approved by the Fire Department. When a hazardous substance is developed in a laboratory, available information shall be documented and maintained at a Fire Department approved location. The Fire Marshal's Office serves as the reporting agency for the City of Englewood, the authority having jurisdiction (AHJ).

SECTION 5004 STORAGE

Section 5004.9 Emergency alarm is replaced as follows:

5004.9 Emergency alarm. An approved manual emergency alarm system shall be provided in buildings, rooms and areas used for the storage of hazardous materials in accordance with this section and Section 908.8. Signage required by Section 908.8 shall state **"DO NOT ENTER WHEN LIGHT IS FLASHING – HAZMAT EMERGENCY ALARM ACTIVATED."**

Section 5004.10 Supervision is replaced as follows:

5004.10 Supervision and monitoring. Emergency alarm, detection and automatic fire-extinguishing systems required by IFC Section 5004, as amended shall be electrically supervised. System shall be monitored by an approved Class I central station service.

Section 5004.12 Noncombustible floor is replaced as follows:

5004.12 Noncombustible floor. Except for surfacing, floors, walkways, ramps, structures for walkways and ramps of storage areas shall be of noncombustible construction.

SECTION 5005 USE, DISPENSING AND HANDLING

Section 5005.1.2 Noncombustible floor is replaced as follows:

5005.1.2 Noncombustible floor. Except for surfacing, floors, walkways, ramps, structures for walkways and ramps of areas where liquid or solid hazardous materials are dispensed or used in open systems shall be of noncombustible, liquid-tight construction.

Section 5005.2.1.1 Ventilation is replaced as follows:

5005.2.1.1 Ventilation. Where gases, liquids or solids having a hazard ranking of 3 or 4 in accordance with NFPA 704 are dispensed or used, mechanical exhaust ventilation shall be provided to capture fumes, mists or vapors at the point of generation. Use as a reference for capture velocity the *American Association of Industrial Hygienists (AAIHC) Handbook*, Volume 25.

Exception: Gases, liquids or solids which can be demonstrated not to create harmful fumes, mists or vapors.

CHAPTER 53

COMPRESSED GASES

Section 5307 Carbon Dioxide (CO₂) Systems Used in Beverage Dispensing Applications is replaced as follows:

SECTION 5307

CARBON DIOXIDE (CO₂) SYSTEMS USED IN BEVERAGE DISPENSING APPLICATIONS

5307.1 General. Carbon dioxide (CO₂) systems with more than 100 pounds (45.4 kg) of carbon dioxide or any system using any amount of carbon dioxide (CO₂) below grade used in beverage dispensing applications shall comply with Sections 5307.2 through 5307.8.

5307.2 Permits. Permits shall be required as set forth in Section 105.

5307.3 Equipment. The storage, use, and handling of carbon dioxide shall be in accordance with IFC Chapter 53, as amended, and the applicable requirements of NFPA 55, Chapter 13. All equipment utilized in compressed gas systems shall be compatible with the intended gas and use.

5307.3.1 Containers, cylinders and tanks. Gas storage containers, cylinders and tanks shall be designed, fabricated, tested, labeled and installed in accordance with manufactures' specifications and shall be maintained in accordance with the regulations of DOTn 49 CFR, Parts 100-185 or the ASME *Boiler and Pressure Vessel Code*, Section VIII.

5307.3.1.1 Location. Location of gas storage containers, cylinders and tanks, inside or outside the building, shall be at an approved location.

5307.3.1.2 Security. Gas storage containers, cylinders and tanks shall be secured in an approved manner to prevent overturning. Containers, cylinders and tanks located outside shall be secured and safeguarded against tampering and protected from physical damage if exposed to vehicle traffic.

5307.3.1.3 Design and construction. Bulk tank installations over 2,000 pounds will require an engineered foundation and construction.

5307.3.2 Piping systems. Piping, tubing, fittings, valves and pressure regulating devices shall be designed and installed in accordance with approved standards and manufacturers' recommendations.

5307.3.2.1 Piping, tubing and hoses. Piping, tubing and hose materials shall be compatible with carbon dioxide and rated for the temperatures and pressures encountered in the system. All hoses and tubing used in carbon dioxide service shall be designed for a bursting pressure of at least four times their design pressure. PVC/ABS and other types of rigid plastic piping are not approved materials. Acceptable piping for carbon dioxide shall be the following:

1. Stainless steel A269 grade, which is either seamless or welded drawn over mandrel
2. Copper K grade, hard drawn seamless

3. Copper ACR grade (1/2 inch outside diameter or less) annealed seamless
4. Plastic/polymer materials rated for use with carbon dioxide and compliant with *Code of Federal Regulations Title 21 FDA Part 177 Indirect Food Additives Polymers*.
5. Additional approved piping, tubing and hoses found in the Compressed Gas Association (CGA) standards for carbon dioxide

5307.3.2.2 Fittings, joints and connections. Fittings, joints and connections shall be subject to the approval of the fire and building departments.

5307.3.2.2.1 Fittings and joints between gas supply containers and automatic shutoff valve. Joints and fittings on the supply piping or tubing between the CO₂ supply source and the automatic system shutoff valve shall be threaded, compression or welded.

5307.3.2.2.2 Unused connections. Unused piping or tubing connected to the supply system shall be capped or plugged. A closed valve will not be allowed in lieu of a cap or plug.

5307.3.2.3 Valves. Piping systems shall be provided with valves in accordance with Sections 5307.3.2.3.1 through 5307.3.2.3.5.

5307.3.2.3.1 Pressure relief valves. Pressure relief valves shall be provided and piped to the outdoors.

5307.3.2.3.2 System shutoff valve. An automatic system shutoff valve shall be provided as near to the supply pressure regulator as possible and shall be designed to fail to a closed condition or close on loss of electrical power.

5307.3.2.3.3 Appliance shutoff valves. Each appliance shall be provided with a shutoff valve within 3 feet of the appliance. All shutoff valves shall be capable of being locked or tagged in the closed position for servicing.

5307.3.2.3.4 Check valves. One-way flow check valves shall be installed at the most downstream end of copper runs that are used for beverage consumption.

5307.3.2.3.5 Accessibility and identification. Valves and controls shall be readily accessible at all times. Normal and emergency system shut-off valves shall be clearly identified. All valves shall be designed or marked to indicate clearly whether it is open or closed.

5307.3.3 Venting. Venting of gases shall be directed to an approved location outside the building. Insulated liquid carbon dioxide systems shall have pressure relief devices vented in accordance with NFPA 55.

5307.4 Protection from damage. Carbon dioxide systems shall be installed so the storage tanks, cylinders, piping and fittings are protected from damage by occupants or equipment during normal facility operations.

5307.5 Required protection. Where carbon dioxide storage tanks, cylinders, piping and equipment are located indoors, rooms or areas containing carbon dioxide storage tanks, cylinders, piping and fittings and other areas where a leak of a carbon dioxide system can collect shall be provided with either ventilation in accordance with Section 5307.5.1 or an emergency alarm system in accordance with Section 5307.5.2.

5307.5.1 Ventilation. Mechanical ventilation shall be in accordance with the *International Mechanical Code* and shall comply with all of the following:

1. Mechanical ventilation in the room or area shall be at a rate of not less than 1 cubic foot per minute per square foot [0.00508 m³/(s • m²)].
2. Exhaust shall be taken from a point within 12 inches (305 mm) of the floor.
3. The ventilation system shall be designed to operate at a negative pressure in relation to the surrounding area.
4. Ventilation shall run continuously or be activated by a sensor or detector to maintain an atmosphere of less than 5,000 ppm.
5. A mechanical permit is required

5307.5.2 Emergency alarm system. An emergency alarm system shall comply with all of the following:

1. Continuous gas detection shall be provided to monitor areas where carbon dioxide (CO₂) can accumulate. Detection equipment shall be provided to indicate carbon dioxide (CO₂) levels at each point of use and in each storage area/room.
2. Detectors shall be:
 - a. listed or approved devices
 - b. permanently mounted
 - c. installed at a height of between 12 - 24 inches above the floor or as approved by the fire code official
 - d. directly connected to building electrical ~~or~~ and fire alarm systems and protected from accidental disconnection or damage
 - e. auto calibrating and self "zeroing" devices are not permitted unless they can be zeroed and spanned
 - f. located within manufacturers specified detection range for each point of use and storage location
3. Alarm set points shall be set at:
 - a. 5,000 PPM (TWA) Time Weighted Average – Self re-setting (non-latching) alarm
 - Notification for employees only in approved locations
 - Supervisory Signal*
 - b. 15,000 PPM – Latching Alarm
 - Notification for employees only in approved locations
 - Requires a service company to investigate, repair and reset

- Supervisory Signal*
- c. 30,000 PPM – Latching Alarm
- Initiate amber strobes and audible horns provided in the vicinity of each interior storage container, cylinder or tank and at each point of use. The notification devices shall be rated a minimum of 80cd for a visible effect and 75 dBA for an audible effect and shall be mounted in accordance with NFPA 72 requirements.
 - Activation of automatic system shutoff valve
 - Evacuate room/area and call 911
 - Alarm Signal*

*In buildings with a monitored sprinkler or fire alarm/detection system, the carbon dioxide (CO₂) emergency alarm system shall be connected to the building fire alarm control panel. A fire alarm permit is required in accordance with the *International Building Code*.

4. Signage shall be required adjacent to each horn/strobe within four inches as follows:

“FLASHING LIGHT MEANS CARBON DIOXIDE LEAK DETECTED – EVACUATE IMMEDIATELY AND CALL 911”

The sign shall have a minimum two-inch block lettering with a minimum ½-inch stroke. The sign shall be on a contrasting surface of black on yellow and shall be of durable construction.

Warning signs shall be posted at the entrances to a room or confined area where the container is located. The warning sign shall be at least 8 inches (200 mm) wide and 6 inches (150 mm) high and state the following:

CAUTION – CARBON DIOXIDE GAS
Ventilate the area before entering. A high carbon dioxide (CO₂) gas concentration in this area can cause suffocation.

NFPA 704 placards for Simple Asphyxiants shall also be provided at the main entrance to storage rooms, areas or confined spaces.

5307.6 Transfilling. Filling and transfilling of gases between storage containers, cylinders and tanks and delivery vehicles shall be performed by qualified personnel using equipment and operating procedures in accordance with CGA P-1. Interior storage containers, cylinders and tanks shall be filled via remote fill ports on the exterior of the building at grade level. Exterior remote fill ports shall be fitted with a vent line to the outside. Delivery personnel shall have access to interior storage areas to inspect valves and piping prior to initiating filling operations.

5307.7 Inspection and testing. All piping installations shall be visually inspected, calibrated, and pressure tested to determine that the materials, design, fabrication and installation practices comply with the requirements of this code.

5307.7.1 Records. A written record of all required inspections, testing, calibration, and maintenance shall be maintained in a log book on the premises containing the three (3) most current years of records and be available for review by fire inspection personnel.

5307.7.2 Required inspections and testing. All piping installations shall be tested and inspected in accordance with Sections 5307.7.2.1 through 5307.7.2.5.

5307.7.2.1 Acceptance testing. Appliances and equipment shall not be placed in operation until after the piping system has been checked for leakage and detectors have been tested by a qualified service company. All piping installations shall be visually inspected and pressure tested prior to initial operation. The test pressure downstream of the pressure regulator shall be not less than 110% of the operating pressure. Joints shall be checked with a bubble-forming solution. Acceptance testing is required to be witnessed by Fire and Building Code Officials.

5307.7.2.2 Daily inspections. All detectors and alarms shall be visibly inspected daily. These inspections are permitted to be conducted by trained employees.

5307.7.2.3 Monthly inspections. All storage vessels, piping, and appurtenances shall be visibly inspected monthly. These inspections are permitted to be conducted by trained employees.

5307.7.2.4 Semi-annual inspections. Systems shall be visually inspected, gas detectors calibrated in accordance with manufacturer specification, alarms tested, and tested for leaks semi-annually by a qualified service company.

5307.7.2.5 Alterations and repair. In the event alterations, repairs or additions are made, the affected piping shall be retested in accordance with Section 5307.7.2.1.

5307.7.3 Reserved.

5307.7.4 Calibration. Detectors shall be checked for accuracy, calibrated to a reference gas concentration, and span reset.

5307.7.5 Pressure testing. Pipe joints shall be exposed for examination during the test.

5307.7.5.1 Test medium. The test medium shall be air, nitrogen, carbon dioxide, or an inert gas.

5307.7.5.2 Section testing. Piping systems shall be permitted to be tested as a complete unit or in sections. A valve shall not be subjected to the test pressure unless it can be determined that the valve, including the valve-closing mechanism, is designed to safely withstand the test pressure.

5307.7.5.3 Regulators and valve assemblies. Regulator and valve assemblies fabricated independently of the piping systems in which they are to be installed shall be permitted to be tested with inert gas or air at the time of fabrication. Test records shall be maintained in accordance with Section 5307.7.1.

5307.7.5.4 Test preparation. All joints and fittings shall be exposed for examination during and after the test.

5307.7.5.4.1 Pipe clearing. Prior to testing, the interior of the pipe shall be cleared of all foreign material.

5307.7.5.4.2 Appliance and equipment isolation. Appliances and equipment that are not to be included in the test shall be isolated from the piping by closing the appliance shutoff valve.

5307.7.5.4.3 Test pressure measurement. Test pressure shall be measured with a pressure-measuring device designed and calibrated to read, record or indicate a pressure loss caused by leakage during the pressure test period. The source of pressure shall be isolated before the pressure tests are made. Mechanical gauges used to measure test pressures shall have a range such that the highest end of the scale is not greater than five times the test pressure.

5307.7.5.4.4 Test pressure. The test pressures shall be as specified in Section 5307.7.2.1. Where the test pressure exceeds 125 psig (862 kPa gauge), the test pressure shall not exceed a value that produces a hoop stress in the piping greater than 50 percent of the specified minimum yield strength of the pipe or tubing. Pressures shall be adjusted smoothly and slowly to avoid pressure spikes.

5307.7.5.5 Test duration. The test duration shall be not less than 10 minutes.

5307.7.5.6 Visual inspection and cleaning. After testing is complete and the pressure is reduced to at or below operating pressure, all joints shall be cleaned of bubble-forming solution and visually inspected

5307.7.5.7 Detection of leaks and defects. The piping system shall withstand the test pressure specified without showing any evidence of leakage or other defects. Any reduction of test pressures as indicated by pressure gauges shall be deemed to indicate the presence of a leak.

5307.7.5.8 Corrections. Where leakage or other defects are located, the affected portion of the piping system shall be repaired or replaced and retested.

5307.8 Training. All employees shall receive annual training in hazard identification, physical properties, inspection, and emergency procedures. Training records shall be maintained on site and be available to fire inspectors upon request.

Section 5309 Inert Gas Systems Used in Commercial, Manufacturing or Industrial Applications is added as follows:

SECTION 5309

INERT GAS SYSTEMS USED IN COMMERCIAL, MANUFACTURING OR INDUSTRIAL APPLICATIONS

5309.1 General. Inert gas systems with more than 100 pounds (45.4 kg) of an inert gas or any system using any amount of an inert gas below grade used in a commercial, manufacturing or industrial application, such as water treatment with pH balancing, food processing or laboratories shall comply with Sections 5309.1 through 5309.8. Inert gases include but are not limited to argon, helium, nitrogen and carbon dioxide. Provisions of Section 5307 are applicable where CO₂ is used.

Exceptions:

1. Medical gas systems

2. Gaseous Fire suppression systems
3. Carbon dioxide gas enrichment systems in accordance with Section 5310

5309.2 Permits. Permits shall be required in accordance with Sections 105.

5309.3 Equipment. The storage, use, and handling of inert gases shall be in accordance with IFC Chapters 53 and 55, as amended, and the applicable requirements of NFPA 55. All equipment utilized in compressed gas systems shall be compatible with the intended gas and use.

5309.3.1 Containers, cylinders and tanks. Gas storage containers, cylinders and tanks shall be designed, fabricated, tested and labeled with manufactures' specifications and shall be maintained in accordance with the regulations of DOTn 49 CFR, Parts 100-185 or the ASME *Boiler and Pressure Vessel Code*, Section VIII.

5309.3.1.1 Location. Location of gas storage containers, cylinders and tanks, inside or outside the building, shall be at an approved location.

5309.3.1.2 Security. Gas storage containers, cylinders and tanks shall be secured in an approved manner to prevent overturning. Containers, cylinders and tanks located outside shall be secured and safeguarded against tampering and protected from physical damage if exposed to vehicle traffic.

5309.3.1.3 Design and construction. Bulk tank installations over 2,000 pounds will require an engineered foundation and construction permit in accordance with the *International Building Code*.

5309.3.2 Piping systems. Piping, tubing, fittings, valves and pressure regulating devices shall be designed and installed in accordance with approved standards and manufacturers' recommendations. PVC/ABS and other types of rigid plastic piping are not approved materials. Valves and controls shall be readily accessible at all times. Normal and emergency shut-off valves shall be clearly identified. Pressure relief valves shall be provided and piped to the outdoors. Each appliance or piece of equipment shall be provided with a shutoff valve within 3 feet of the appliance or piece of equipment. Automatic system shutoff valves shall be provided as near to the supply pressure regulator or container as possible and designed to fail to a closed condition or close on loss of electrical power. All valves shall be designed or marked to indicate clearly whether it is open or closed.

5309.3.3 Venting. Venting of gases shall be directed to an approved location outside the building. Insulated liquid gas systems shall have pressure relief devices vented in accordance with NFPA 55.

5309.4 Protection from damage. Inert gas systems shall be installed so the storage tanks, cylinders, piping and fittings are protected from damage by occupants or equipment during normal facility operations.

5309.5 Required protection. Where inert gas storage tanks, cylinders, piping and equipment are located indoors, rooms or areas containing inert gas storage tanks, cylinders, piping and fittings and other areas where a leak of an inert gas system can collect shall be provided with either ventilation in accordance with Section 5309.5.1 or an emergency alarm system in accordance with Section 5309.5.2.

5309.5.1 Ventilation. Mechanical ventilation shall be in accordance with the *International Mechanical Code* and shall comply with all of the following:

1. Mechanical ventilation in the room or area shall be at a rate of not less than 1 cubic foot per minute per square foot [$0.00508 \text{ m}^3/(\text{s} \cdot \text{m}^2)$].
2. Exhaust ventilation shall be designed to consider the density of the potential vapors released. For vapors that are heavier than air, exhaust shall be taken from a point within 12 inches (305 mm) of the floor. For vapors that are lighter than air, exhaust shall be taken from a point within 12 inches (305 mm) of the highest point of the room.
3. The ventilation system shall be designed to operate at a negative pressure in relation to the surrounding area.
4. Ventilation shall run continuously or be activated by a sensor or detector to maintain an atmosphere of not less than 19.5% oxygen in the room.
5. A mechanical permit is required in accordance with the *International Building Code*.

5309.5.2 Emergency alarm system. An emergency alarm system shall comply with all of the following:

1. Continuous gas detection shall be provided to monitor areas where a leak of an inert gas system can collect and create an oxygen deficient atmosphere. Detection equipment shall be provided at each point of use and in each storage area/room.
2. Detectors shall be:
 - a. listed or approved devices
 - b. permanently mounted
 - c. installed at a height consistent with the vapor density of the gas
 - d. directly connected to the building electrical supply and fire alarm system and protected from accidental disconnection or damage
 - e. auto calibrating and self "zeroing" devices are not permitted unless they can be zeroed and spanned
 - f. located within manufactures' specified detection range for each point of use and storage location
3. Activation of the emergency alarm system shall initiate amber strobes and audible horns provided in the vicinity of each interior storage container, cylinder or tank and at each point of use in accordance with alarm set points. The notification devices shall be rated a minimum of 80cd for a visible effect and 75 dBA for an audible effect and shall be mounted in accordance with NFPA 72 requirements.
4. Alarm set points shall be set at:
 - a. Oxygen levels below 19.5% – Self re-setting (non-latching) alarm
 - Visual notification only in approved locations

- Supervisory signal*
- b. Oxygen levels below 17% – Latching Alarm
- Visual and audible notification in approved locations
 - Activation of automatic system shutoff valve
 - Evacuate room/area and call 911
 - Alarm signal*

*In buildings with a monitored sprinkler or fire alarm/detection system, the inert gas emergency alarm system shall be connected to the building fire alarm control panel. A fire alarm permit is required in accordance with the *International Building and Fire Code*.

5. Signage shall be required adjacent to each horn/strobe within four inches as follows.

Outside the Storage Area/Room:

“DO NOT ENTER WHEN LIGHT IS FLASHING – OXYGEN DEFICIENT ATMOSPHERE DETECTED”

Inside the Storage Area/Room or at point of use:

“FLASHING LIGHT MEANS OXYGEN DEFICIENT ATMOSPHERE DETECTED – EVACUATE IMMEDIATELY AND CALL 911”

The sign shall have a minimum 2-inch block lettering with a minimum ½-inch stroke. The sign shall be on a contrasting surface of black on yellow and shall be of durable construction. Signage shall be provided on each storage area entry door stating:



NFPA 704 placards for simple asphyxiants shall also be provided at the main entrance to storage rooms/areas.

5309.6 Transfilling. Filling and transfilling of gases between storage containers, cylinders and tanks and delivery vehicles shall be performed by qualified personnel using equipment and operating procedures in accordance with CGA P-1. Interior storage containers, cylinders and tanks shall be filled via remote fill ports on the exterior of the building at grade level. Exterior remote fill ports shall be fitted with a vent line to the outside. Delivery personnel shall have access to interior storage areas to inspect valves and piping prior to initiating filling operations.

5309.7 Inspection and testing. All piping installations shall be visually inspected, calibrated, and pressure tested to determine that the materials, design, fabrication and installation practices comply with the requirements of this code.

5309.7.1 Records. A written record of all required inspections, testing, calibration, and maintenance shall be maintained in a log book on the premises containing the three most current years of records and be available for review by fire inspection personnel.

5309.7.2 Required inspections and testing. All piping installations shall be tested and inspected in accordance with Sections 5309.7.2.1 through 5309.7.2.5.

5309.7.2.1 Acceptance testing. Appliances and equipment shall not be placed in operation until after the piping system has been checked for leakage and detectors have been tested by a qualified service company. All piping installations shall be visually inspected and pressure tested prior to initial operation. The test pressure downstream of the pressure regulator shall be not less than 1½ times the proposed operating pressure. Joints shall be checked with a bubble-forming solution. Acceptance testing is required to be witnessed by Fire and Building Code Officials.

5309.7.2.2 Daily inspections. All detectors and alarms shall be visibly inspected daily. These inspections are permitted to be conducted by trained employees.

5309.7.2.3 Monthly inspections. All storage vessels, piping, and appurtenances shall be visibly inspected monthly. These inspections are permitted to be conducted by trained employees.

5309.7.2.4 Semi-annual inspections. Systems shall be visually inspected, gas detectors calibrated in accordance with manufacturer specification, alarms tested, and tested for leaks semi-annually by a qualified service company.

5309.7.2.5 Alterations and repair. In the event alterations, repairs or additions are made, the affected piping shall be retested in accordance with Section 5309.7.2.1.

5309.7.3 Reserved.

5309.7.4 Calibration. Detectors shall be checked for accuracy, calibrated to a reference gas concentration, and span reset.

5309.7.5 Pressure testing. Pipe joints shall be exposed for examination during the test.

5309.7.5.1 Test medium. The test medium shall be air, nitrogen, carbon dioxide, or an inert gas.

5309.7.5.2 Section testing. Piping systems shall be permitted to be tested as a complete unit or in sections. A valve shall not be subjected to the test pressure unless it can be determined that the valve, including the valve-closing mechanism, is designed to safely withstand the test pressure.

5309.7.5.3 Regulators and valve assemblies. Regulator and valve assemblies fabricated independently of the piping systems in which they are to be installed shall be permitted to be

tested with inert gas or air at the time of fabrication. Test records shall be maintained in accordance with Section 5309.7.1.

5309.7.5.4 Test preparation. All joints and fittings shall be exposed for examination during and after the test.

5309.7.5.4.1 Pipe clearing. Prior to testing, the interior of the pipe shall be cleared of all foreign material.

5309.7.5.4.2 Appliance and equipment isolation. Appliances and equipment that are not to be included in the test shall be disconnected from the piping by closing the isolation shutoff valve.

5309.7.5.4.3 Test pressure measurement. Test pressure shall be measured with a pressure-measuring device designed and calibrated to read, record or indicate a pressure loss caused by leakage during the pressure test period. The source of pressure shall be isolated before the pressure tests are made. Mechanical gauges used to measure test pressures shall have a range such that the highest end of the scale is not greater than five times the test pressure.

5309.7.5.4.4 Test pressure. The test pressures shall be as specified in Section 5309.7.2.1. Where the test pressure exceeds 125 psig (862 kPa gauge), the test pressure shall not exceed a value that produces a hoop stress in the piping greater than 50 percent of the specified minimum yield strength of the pipe or tubing. Pressures shall be adjusted smoothly and slowly to avoid pressure spikes.

5309.7.5.5 Test duration. The test duration shall be not less than 1/2 hour for each 500 cubic feet (14 m³) of pipe volume or fraction thereof. When testing a system having a volume less than 10 cubic feet (0.28 m³) the test duration shall be not less than 10 minutes. The duration of the test shall not be required to exceed 24 hours.

5309.7.5.6 Visual inspection and cleaning. After testing is complete and the pressure is reduced to at or below operating pressure, all joints shall be cleaned of bubble-forming solution and visually inspected

5309.7.5.7 Detection of leaks and defects. The piping system shall withstand the test pressure specified without showing any evidence of leakage or other defects. Any reduction of test pressures as indicated by pressure gauges shall be deemed to indicate the presence of a leak.

5309.7.5.8 Corrections. Where leakage or other defects are located, the affected portion of the piping system shall be repaired or replaced and retested.

5309.8 Training. All employees shall receive annual training in hazard identification, physical properties, inspection, and emergency procedures. Training records shall be maintained on site and be available to inspectors upon request.

Section 5310 Carbon Dioxide (CO₂) gas enrichment systems using on-site supply tanks and/or cylinders in plant growing (husbandry) applications is added as follows:

SECTION 5310

CARBON DIOXIDE (CO₂) GAS ENRICHMENT SYSTEMS USING ON-SITE SUPPLY TANKS AND/OR CYLINDERS IN PLANT GROWING (HUSBANDRY) APPLICATIONS

5310.1 General. Carbon dioxide enrichment systems with more than 100 pounds (45.4 kg) of carbon dioxide or any system using any amount of carbon dioxide (CO₂) below grade used in plant growing (husbandry) applications shall comply with Sections 5310.2 through 5310.8.

5310.2 Permits. Permits shall be required in accordance with Sections 105 and in accordance with Denver Fire Department policy.

5310.3 Equipment. The storage, use, and handling of carbon dioxide shall be in accordance with IFC Chapter 53, as amended, and the applicable requirements of NFPA 55, Chapter 13. All equipment utilized in compressed gas systems shall be compatible with the intended gas and use.

5310.3.1 Containers, cylinders and tanks. Gas storage containers, cylinders and tanks shall be designed, fabricated, tested and labeled with manufactures' specifications and shall be maintained in accordance with the regulations of DOTn 49 CFR, Parts 100-185 or the ASME Boiler and Pressure Vessel Code, Section VIII.

5310.3.1.1 Location. Location of gas storage containers, cylinders and tanks, inside or outside the building, shall be at an approved location.

5310.3.1.2 Security. Gas storage containers, cylinders and tanks shall be secured in an approved manner to prevent overturning. Containers, cylinders and tanks located outside shall be secured and safeguarded against tampering and protected from physical damage if exposed to vehicle traffic.

5310.3.1.3 Design and construction. Bulk tank installations over 2,000 pounds will require an engineered foundation and construction permit in accordance with the Building Code.

5310.3.2 Piping systems. Piping, tubing, fittings, valves and pressure regulating devices shall be designed and installed in accordance with approved standards and manufacturers' recommendations.

5310.3.2.1 Piping, tubing and hoses. Piping, tubing and hose materials shall be compatible with carbon dioxide and rated for the temperatures and pressures encountered in the system. All hoses and tubing used in carbon dioxide service shall be designed for a bursting pressure of at least four times their design pressure. PVC/ABS and other types of rigid plastic piping are not approved materials. Acceptable piping for carbon dioxide shall be the following:

- a. Stainless steel A269 grade, which is either seamless or welded drawn over mandrel
- b. Copper K grade, hard drawn seamless
- c. Copper ACR grade (1/2 inch outside diameter or less) annealed seamless
- d. Plastic/polymer materials rated for use with carbon dioxide

- e. Additional approved piping, tubing and hoses found in the Compressed Gas Association (CGA) standards for carbon dioxide

5310.3.2.2 Fittings, joints and connections. Fittings, joints and connections shall be subject to the approval of the fire and building departments.

5310.3.2.2.1 Fittings and joints between gas supply containers and automatic shutoff valve. Joints and fittings on the supply piping or tubing between the CO₂ supply source and the automatic system shutoff valve shall be threaded, compression or welded.

5310.3.2.2.2 Unused connections. Unused piping or tubing connected to the supply system shall be capped or plugged. A closed valve will not be allowed in lieu of a cap or plug.

5310.3.2.3 Valves. Piping systems shall be provided with valves in accordance with Sections 5307.3.2.3.1 through 5307.3.2.3.4.

5310.3.2.3.1 Pressure relief valves. Pressure relief valves shall be provided and piped to the outdoors.

5310.3.2.3.2 System shutoff valve. An automatic system shutoff valve shall be provided as near to the supply pressure regulator as possible and shall be designed to fail to a closed condition or close on loss of electrical power.

5310.3.2.3.3 Appliance shutoff valves. Each appliance shall be provided with a shutoff valve within 3 feet of the appliance. All shutoff valves shall be capable of being locked or tagged in the closed position for servicing.

5310.3.2.3.4 Accessibility and identification. Valves and controls shall be readily accessible at all times. Normal and emergency system shut-off valves shall be clearly identified. All valves shall be designed or marked to indicate clearly whether it is open or closed.

5310.3.3 Venting. Venting of gases shall be directed to an approved location outside the building. Insulated liquid carbon dioxide systems shall have pressure relief devices vented in accordance with NFPA 55.

5310.4 Protection from damage. Carbon dioxide systems shall be installed so the storage tanks, cylinders, piping and fittings are protected from damage by occupants or equipment during normal facility operations.

5310.5 Required protection. Where carbon dioxide storage tanks, cylinders, piping and equipment are located indoors, rooms or areas containing carbon dioxide storage tanks, cylinders, piping and fittings and grow room/areas where carbon dioxide is released and can collect shall be provided with an emergency alarm system in accordance with Section 5310.5.1.

5310.5.1 Emergency alarm system. An emergency alarm system shall comply with all of the following:

1. Continuous gas detection shall be provided to monitor areas where carbon dioxide (CO₂) can accumulate. Detection equipment shall be provided to indicate carbon dioxide (CO₂) levels in each grow cultivation area/room and interior carbon dioxide (CO₂) storage location.

2. Detectors shall be:
 - a. listed or approved devices
 - b. permanently mounted
 - c. installed at a height of no more than 48 inches above the floor or as approved by the fire code official
 - d. directly connected to building electrical supply and ~~or~~ fire alarm systems and protected from accidental disconnection or damage
 - e. auto calibrating and self “zeroing” devices are not permitted unless they can be zeroed and spanned
 - f. located within manufacturers specified detection range for each point of use and storage location
3. Activation of the emergency alarm system shall initiate amber strobes and audible horns provided in the vicinity of each interior storage container, cylinder or tank and at each point of release. The notification devices shall be rated a minimum of 80cd for a visible effect and 75 dBA for an audible effect and shall be mounted in accordance with NFPA 72 requirements. Provide audible visual devices at the following locations:
 - Inside an interior storage room/area and outside the room/area at each entrance.
 - Inside grow cultivation room/areas.
4. Local alarm set points shall be set at:
 - a. 5,000 PPM – Latching Alarm
 - Visual and audible notification in approved locations at room or area in alarm
 - Activation of automatic system shut off valve
 - Evacuate the room in alarm and contact a qualified service company to investigate and address the condition.
 - Reset of the emergency alarm to be conducted by qualified personnel.
5. Signage shall be required adjacent to each horn/strobe within 4 inches as follows.

Storage area/room:

**“DO NOT ENTER WHEN LIGHT IS FLASHING - CARBON DIOXIDE LEAK
DETECTED”**

Grow cultivation room/area dispensing:

**“FLASHING LIGHT MEANS CARBON DIOXIDE LEAK DETECTED – EVACUATE
ROOM”**

The sign shall have a minimum 2-inch block lettering with a minimum ½-inch stroke. The sign shall be on a contrasting surface of black on yellow and shall be of durable construction. Signage shall be provided at entrance doors to each grow cultivation room/area and at each entrance to storage rooms/areas:



NFPA 704 placards for simple asphyxiants shall also be provided at the exterior main entrance and at each entrance to storage rooms/areas.

6. A minimum of one portable carbon dioxide (CO₂) meter shall be in use during business hours.

5310.6 Transfilling. Filling and transfilling of gases between storage containers, cylinders and tanks and delivery vehicles shall be performed by qualified personnel using equipment and operating procedures in accordance with CGA P-1. Interior storage containers, cylinders and tanks shall be filled via remote fill ports on the exterior of the building at grade level. Exterior remote fill ports shall be fitted with a vent line to the outside. Delivery personnel shall have access to interior storage areas to inspect valves and piping prior to initiating filling operations.

5310.7 Inspection and testing. All piping installations shall be visually inspected, calibrated, and pressure tested to determine that the materials, design, fabrication and installation practices comply with the requirements of this code.

5310.7.1 Records. A written record of all required inspections, testing, calibration, and maintenance shall be maintained in a log book on the premises containing the three (3) most current years of records and be available for review by fire inspection personnel.

5310.7.2 Required inspections and testing. All piping installations shall be tested and inspected in accordance with Sections 5310.7.2.1 through 5310.7.2.5.

5310.7.2.1 Acceptance testing. Appliances and equipment shall not be placed in operation until after the piping system has been checked for leakage and detectors have been tested by a qualified service company. All piping installations shall be visually inspected and pressure tested prior to initial operation. The test pressure downstream of the pressure regulator shall be not less than 110% of the operating pressure. Joints shall be checked with a bubble-forming solution. Acceptance testing is required to be witnessed by Fire and Building Code Officials.

5310.7.2.2 Daily inspections. All detectors and alarms shall be visibly inspected daily. These inspections are permitted to be conducted by trained employees.

5310.7.2.3 Monthly inspections. All storage vessels, piping, and appurtenances shall be visibly inspected monthly. These inspections are permitted to be conducted by trained employees.

5310.7.2.4 Semi-annual inspections. Systems shall be visually inspected, gas detectors calibrated in accordance with manufacturer specification, alarms tested, and tested for leaks semi-annually by a qualified service company.

5310.7.2.5 Alterations and repair. In the event alterations, repairs or additions are made, the affected piping shall be retested in accordance with Section 5310.7.2.1.

5310.7.3 Reserved.

5310.7.4 Calibration. Detectors shall be checked for accuracy, calibrated to a reference gas concentration, and span reset.

5310.7.5 Pressure testing. Pipe joints shall be exposed for examination during the test.

5310.7.5.1 Test medium. The test medium shall be air, nitrogen, carbon dioxide, or an inert gas.

5310.7.5.2 Section testing. Piping systems shall be permitted to be tested as a complete unit or in sections. A valve shall not be subjected to the test pressure unless it can be determined that the valve, including the valve-closing mechanism, is designed to safely withstand the test pressure.

5310.7.5.3 Regulators and valve assemblies. Regulator and valve assemblies fabricated independently of the piping systems in which they are to be installed shall be permitted to be tested with inert gas or air at the time of fabrication. Test records shall be maintained in accordance with Section 5310.7.1.

5310.7.5.4 Test preparation. All joints and fittings shall be exposed for examination during and after the test.

5310.7.5.4.1 Pipe clearing. Prior to testing, the interior of the pipe shall be cleared of all foreign material.

5310.7.5.4.2 Appliance and equipment isolation. Appliances and equipment that are not to be included in the test shall be isolated from the piping by closing the appliance shutoff valve.

5310.7.5.4.3 Test pressure measurement. Test pressure shall be measured with a pressure-measuring device designed and calibrated to read, record or indicate a pressure loss caused by leakage during the pressure test period. The source of pressure shall be isolated before the pressure tests are made. Mechanical gauges used to measure test pressures shall have a range such that the highest end of the scale is not greater than five times the test pressure.

5310.7.5.4.4 Test pressure. The test pressures shall be as specified in Section 5310.7.2.1. Where the test pressure exceeds 125 psig (862 kPa gauge), the test pressure shall not exceed a value that produces a hoop stress in the piping greater than 50 percent of the specified minimum yield strength of the pipe or tubing. Pressures shall be adjusted smoothly and slowly to avoid pressure spikes.

5310.7.5.5 Test duration. The test duration shall be not less than 10 minutes.

5310.7.5.6 Visual inspection and cleaning. After testing is complete and the pressure is reduced to at or below operating pressure, all joints shall be cleaned of bubble-forming solution and visually inspected.

5310.7.5.7 Detection of leaks and defects. The piping system shall withstand the test pressure specified without showing any evidence of leakage or other defects. Any reduction of test pressures as indicated by pressure gauges shall be deemed to indicate the presence of a leak.

5310.7.5.8 Corrections. Where leakage or other defects are located, the affected portion of the piping system shall be repaired or replaced and retested.

5310.8 Training. All employees shall receive annual training in hazard identification, physical properties, inspections, and emergency procedures. Training records shall be maintained on site and be available to inspectors upon request.

Section 5311 Carbon Dioxide (CO₂) Gas Enrichment Systems Using a Natural Gas Burner in Plant Growing (Husbandry) Applications is added as follows:

SECTION 5311

CARBON DIOXIDE (CO₂) GAS ENRICHMENT SYSTEMS USING A NATURAL GAS BURNER IN PLANT GROWING (HUSBANDRY) APPLICATIONS

5311.1 General. Natural gas burners that are utilized to generate carbon dioxide (CO₂) in plant growing (husbandry) applications shall comply with Sections 5311.2 through 5311.6. A mechanical exhaust system shall be provided as required by the *International Mechanical Code*.

5311.2 Permits. Permits shall be required in accordance with Section 105.

5311.3 Equipment. Natural gas burners shall be listed, labeled and installed in accordance with the manufacturer's installation instructions. Piping systems, combustion and ventilation air and venting for natural gas appliances shall be designed and installed in accordance with approved standards, the International Fuel Gas Code and manufacturer's recommendations.

5311.4 Required protection. Where natural gas burners are located indoors for carbon dioxide (CO₂) enrichment, grow room/areas shall be provided with an emergency alarm system in accordance with Section 5311.4.1 and carbon monoxide detection in accordance with Section 5311.4.2.

5311.4.1 Emergency alarm system. An emergency alarm system shall comply with all of the following:

1. Continuous gas detection shall be provided to monitor areas where carbon dioxide (CO₂) can accumulate. Detection equipment shall be provided to indicate carbon dioxide (CO₂) levels in each grow cultivation area/room.
2. Detectors shall be:
 - a. listed or approved devices

- b. permanently mounted
 - c. installed at a height of no more than 48 inches above the floor or as approved by the fire code official
 - d. directly connected to building electrical supply and ~~or~~ fire alarm systems and protected from accidental disconnection or damage
 - e. auto calibrating and self “zeroing” devices are not permitted unless they can be zeroed and spanned
 - f. located within manufacturer’s specified detection range for each point of release
3. Activation of the emergency alarm system shall initiate amber strobes and audible horns provided in each room/area where carbon dioxide (CO₂) can accumulate. The notification devices shall be rated a minimum of 80cd for a visible effect and 75 dBA for an audible effect and shall be mounted in accordance with NFPA 72 requirements. Provide notification devices at the following locations:
- Inside grow cultivation room/areas.
4. Local alarm set points shall be set at:
- 5,000 PPM – Latching Alarm
- Visual and audible notification in approved locations at room or area in alarm
 - Activation of natural gas control valves to each burner to a closed position stopping the generation of carbon dioxide (CO₂)
 - Evacuate the room in alarm and contact a qualified service company.
 - Reset of emergency alarm to be conducted by qualified personnel.
5. Signage will be required adjacent to each horn/strobe within 4 inches as follows:
- Grow cultivation room/area dispensing:
- “FLASHING LIGHT MEANS CARBON DIOXIDE LEAK DETECTED – EVACUATE ROOM”**
- The sign shall have a minimum 2-inch block lettering with a minimum ½-inch stroke. The sign shall be on a contrasting surface of black on yellow and shall be of durable construction. Signage shall be provided at entrance doors to each grow cultivation room/area:



NFPA 704 placards for simple asphyxiants shall also be provided at the exterior main entrance.

6. All carbon dioxide (CO₂) burner systems shall shut down in the event of a loss of electrical power to the carbon dioxide (CO₂) detectors.
7. A minimum of one (1) portable carbon dioxide (CO₂) meter shall be in use during business hours.

5311.4.2 Carbon monoxide (CO) detection.

1. Carbon monoxide (CO) gas detection shall be provided to monitor products of combustion continuously.
2. Detectors shall be:
 - a. listed or approved devices
 - b. permanently mounted
 - c. Installed per manufacturer's recommendations and directions
 - d. directly connected to building electrical supply and fire alarm systems and protected from accidental disconnection or damage
3. CO detection shall be set at 35 PPM and upon activation shall initiate the following:
 - Close the valve to each burner
 - Activate the mechanical exhaust system
4. All carbon dioxide (CO₂) burner systems shall shut down in the event of a loss of electrical power to the carbon monoxide (CO) detectors.
5. A minimum of one (1) portable carbon monoxide (CO) meter shall be in use during business hours.

5311.5 Inspection and testing. All detectors, alarms and carbon dioxide (CO₂) burners must be visually inspected, calibrated, and tested to determine that the materials, design, fabrication and installation practices comply with the requirements of this code.

5311.5.1 Records. A written record of all required inspections, testing, calibration, and maintenance shall be maintained in a log book on the premises containing the three (3) most current years of records and be available for review by fire inspection personnel.

5311.5.2 Required inspections and testing. All detectors, alarms and carbon dioxide (CO₂) burner equipment shall be tested and inspected in accordance with Sections 5311.5.2.1 through 5311.5.2.6.

5311.5.2.1 Acceptance testing. Appliances and equipment shall not be placed in operation until after the detectors, alarms, gas control valves and mechanical exhaust system have been tested by a qualified service company. Acceptance testing is required to be witnessed by Fire and Building Code Officials.

5311.5.2.2 Daily inspections. All detectors and alarms shall be visibly inspected daily. These inspections are permitted to be conducted by trained employees.

5311.5.2.3 Monthly inspections. All carbon dioxide (CO₂) burners and appurtenances shall be visibly inspected monthly. These inspections are permitted to be conducted by trained employees.

5311.5.2.4 Semi-annual inspections. Systems shall be visually inspected and gas detectors calibrated in accordance with manufacturer specification semi-annually by a qualified service company.

5311.5.2.5 Annual testing. All detectors, alarms, gas control valves and mechanical exhaust systems shall be tested annually by a qualified service company.

5311.5.2.6 Alterations and repair. In the event alterations, repairs or additions are made, the affected equipment shall be retested in accordance with Section 5311.5.2.1.

5311.5.3 Reserved

5311.5.4 Calibration. Detectors shall be checked for accuracy, calibrated to a reference gas concentration, and span reset.

5311.6 Training. All employees shall receive annual training in hazard identification, physical properties, inspections, and emergency procedures. Training records shall be maintained on site and be available to inspectors upon request.

CHAPTER 56

EXPLOSIVES AND FIREWORKS

SECTION 5601

GENERAL

Section 5601.1 Scope is amended by deleting all Exceptions.

Section 5601.1.3 Fireworks is amended by deleting Exceptions 1, 2, and 4.

Section 5601.2.4 Financial responsibility is replaced as follows:

5601.2.4 Financial responsibility. Before a permit is issued, as required by Section 105.6, the applicant shall file with the Fire Marshal's Office a surety bond in the principal sum of \$2,000,000 or a public liability insurance policy for the same amount, for the purpose of the payment of all damages to persons or property which 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 or lesser amount when, in his or her opinion, conditions at the location of use indicate a greater or lesser amount is required. Government entities shall be exempt from this bond requirement.

Section 5601.4 Qualifications is replaced as follows:

5601.4 Qualifications. Persons in charge of magazines, blasting, fireworks display, or pyrotechnic special effect operations shall obtain the appropriate State of Colorado license. For pyrotechnic special effect operations, the license is that required for an outdoor display operator. Persons in charge of magazines, blasting, fireworks display, or pyrotechnic special effect operations shall not be under the influence of alcohol or drugs which impair sensory or motor skills, shall be at least 21 years of age, and shall demonstrate knowledge of all safety precautions related to the storage, handling, or use of explosive, explosive material, or fireworks.

Section 5601.5 Supervision is replaced as follows:

5601.5 Supervision. The Fire Code Official is authorized to require operations permitted under the provisions of Section 105.6 to be supervised at any time by the Fire Code Official in order to determine compliance with all safety and fire regulations. The Denver Fire Department Fire Prevention pyrotechnics personnel shall be retained for fire watch and to inspect all equipment and powder charges. The pyrotechnics firm to which the permit is issued/granted shall be responsible for the cost of this/these personnel.

CHAPTER 57

FLAMMABLE AND COMBUSTIBLE LIQUIDS

SECTION 5701 GENERAL

Section 5701.2 Non-applicability is amended by replacing Item 10 and adding Item 12 as follows:

10. The manufacture, storage, dispensing, and use of alcoholic beverages with 16% or less alcohol by volume and the remainder of the beverage not being flammable.
12. The manufacture, storage, dispensing, and handling of alcohol beverages with greater than 16% alcohol by volume shall be in accordance with Chapter 38.

Section 5701.5.1 Altitude correction is added as follows:

5701.5.1 Altitude correction. Altitude has a direct impact on the physical properties of flammable and combustible liquids and shall be accounted in the design considerations of life safety and property protection systems. Flash point and boiling point information for flammable and combustible liquids is referenced to sea level. In Denver, Colorado, the flash point and boiling point of flammable and combustible liquids will reduce by 8° F and may cause reclassification of flammable and combustible liquids.

SECTION 5703 GENERAL REQUIREMENTS

Section 5703.6.2.2 Bulk transfer and process transfer piping is added as follows:

5703.6.2.2 Bulk transfer and process transfer piping. Closed double-wall steel piping and leak monitoring shall be required for bulk transfer and process transfer of flammable and combustible liquids inside buildings in the following applications:

1. Piping used for the manual transfer of fuel oil
2. Piping used for the automatic transfer of fuel oil from a stationary supply tank, located inside or outside the building, to fuel-burning equipment with or without a day tank
3. Piping used to transfer Class 1A, 1B and 1C flammable liquids

Exception: Single wall metallic piping may be used where:

1. the fuel storage tank and fuel-burning equipment are located in a parking garage
2. the fuel storage tank and fuel-burning equipment are located aboveground exterior to the building
3. fuel is automatically transferred from a tank vehicle to a stationary tank, provided the piping system is exposed and continuously supervised by trained personnel during the transfer operation
4. fuel is manually transferred inside a building from a portable tank not greater than 55 gallons provided the piping system is exposed and continuously supervised by trained personnel during the transfer operation.

Section 5703.6.2.3 Piping material is added as follows:

5703.6.2.3 Piping material. Metallic piping and installation shall be in accordance with Table 5703.6.2.3 and *ASME B31, Code for Pressure Piping*.

**TABLE 5703.6.2.3
PIPING MATERIAL STANDARDS**

MATERIAL	STANDARDS
Copper or copper-alloy pipe	ASTM B 42; ASTM B 302
Steel pipe	ASTM A 53; ASTM A 106

Section 5703.6.10 Pipe joints is amended by adding Exceptions 1 and 2 as follows:

Exceptions:

1. All joints in closed double wall steel piping required by Section 5703.6.2.2 shall be welded.
2. All joints in single wall pipe regulated by Section 5703.6.2.2 shall be welded or threaded. Flanged and other mechanical joints are not permitted.

**SECTION 5704
STORAGE**

Section 5704.2.13 Abandonment and status of tanks is replaced as follows:

5704.2.13 Abandonment and status of tanks. Tanks taken out of service shall be removed in accordance with IFC Section 5704.2.14, or where approved by the Fire Code Official safeguarded in accordance with IFC Sections 5704.2.13.1 through 5704.2.13.2.3 and American Petroleum Institute *Standard API RP 1604*.

Section 5704.2.13.1.4 Tanks abandoned in place is deleted.

Section 5704.3.8.5 Warehouse hose lines is deleted.

Section 5704.4.3 Spill control and secondary containment is by replacing the Exception as follows:

Exception: Containers stored on approved containment pallets in accordance with IFC Section 5004.2.3 and containers stored in cabinets and lockers with integral spill containment. Storage of liquids classified as a Class III-B Combustible shall not be required to have secondary containment.

**SECTION 5706
SPECIAL OPERATIONS**

Section 5706.2.5 Type of tank is replaced as follows:

5706.2.5 Type of tank. Tanks shall be provided with top openings only. Dispensing by use of gravity is prohibited.

Section 5706.2.5.2 Tanks for gravity discharge is deleted.

CHAPTER 60

HIGHLY TOXIC AND TOXIC MATERIALS

SECTION 6004 HIGHLY TOXIC AND TOXIC COMPRESSED GASES

Section 6004.2.2.10.2 Alarms is replaced as follows:

6004.2.2.10.2 Alarms. The gas detection system shall initiate a local alarm and transmit a signal to a constantly attended control station when a short-term hazard condition is detected. The alarm shall be in accordance with Section 908.8. Signage required by Section 908.8 shall state: **“DO NOT ENTER WHEN LIGHT IS FLASHING – [HIGHLY] TOXIC GAS LEAK DETECTED.”**

Exception: Signal transmission to a constantly attended control station is not required where not more than one cylinder of highly toxic or toxic gas is stored.

SECTION 6005 OZONE GAS GENERATORS

Section 6005.3.2 Ozone gas generator rooms is replaced as follows:

6005.3.2 Ozone gas generator rooms. Ozone gas generator rooms shall be mechanically ventilated in accordance with the *International Mechanical Code* with a minimum of six air changes per hour. Ozone gas generator rooms shall be equipped with a continuous gas detection system which will shut off the generator and sound a local alarm when concentrations above the permissible exposure limit occur. The alarm shall be in accordance with Section 908.8. Signage required by Section 908.8 shall state: **“DO NOT ENTER WHEN LIGHT IS FLASHING – OZONE CONCENTRATION ABOVE THE PERMISSIBLE EXPOSURE LIMIT DETECTED.”**

Ozone gas-generator rooms shall not be normally occupied, and such rooms shall be kept free of combustible and hazardous material storage. Room access doors shall display an approved sign stating: **“OZONE GAS GENERATOR—HIGHLY TOXIC—OXIDIZER.”**

CHAPTER 61

LIQUEFIED PETROLEUM GASES

SECTION 6101 **GENERAL**

Section 6101.2 Permits is replaced as follows:

6101.2 Permits. Permits shall be required as set forth in Section 105.

Distributors shall not install or fill an LP-gas container for which a permit is required unless a permit for installation has been issued for that location by the Fire Code Official. Installation of all tanks requires submittal of a site plan depicting proposed location on the property and all rights-of-way, structures, and proposed piping.

Section 6101.4 Prohibition is added as follows:

6101.4 Prohibition. The installation of LP-gas containers and use of LP gas is prohibited where a source of natural gas is within 300 feet of the nearest property line.

Exception:

1. LP-gas containers in accordance with this Section, NFPA 58, and the applicable provisions of IFC Chapters 3, 6, 31, 33 and 57, as amended.
2. Dispensing installations and operations in accordance with this Section, NFPA 58 and the applicable provisions of IFC Chapter 23, as amended.

SECTION 6103 **INSTALLATION OF EQUIPMENT**

Section 6103.2.1.7 Use for food preparation is amended by adding the following sentence to the end of the section:

Such containers shall not exceed a water capacity of 2.5 lbs. (1 kg).

SECTION 6104 **LOCATION OF LP-GAS CONTAINERS**

Section 6104.2 Maximum capacity within established limits is amended by adding Exceptions 2 and 3 as follows:

Exceptions:

2. For dwellings constructed under the IRC, a maximum of 40 pounds of propane [or two (2) 20 -lb. cylinders—one for use and one spare bottle] shall be permitted on the premises. For quantity limits inside the actual dwelling unit, see NFPA 58, 8.3.5.

Exception: Live/work units shall comply with IBC Section 419.

3. For multi-family dwellings, one (1) 20-lb. propane cylinder is allowed to be stored in each detached garage or detached storage area.

SECTION 6107
SAFETY PRECAUTIONS AND DEVICES

Section 6107.4 Protecting containers from vehicles is amended by changing the reference from “NFPA 58” to “IFC Section 312.”

SECTION 6109
STORAGE OF PORTABLE LP-GAS CONTAINERS AWAITING USE OR RESALE

Section 6109.13 Protection of containers is amended by deleting the Exception.

Section 6109.15.1 Automated cylinder exchange stations, Item 1, is replaced as follows:

1. The vending system shall only permit access to a single cylinder not to exceed 20 lbs. (9.07 kg) per individual transaction.

CHAPTER 63

OXIDIZERS, OXIDIZING GASES AND OXIDIZING CRYOGENIC FLUIDS

SECTION 6301 GENERAL

Section 6301.3 Oxygen coordinator or oxygen supply and delivery personnel is added as follows:

6301.3 Oxygen coordinator or oxygen supply and delivery personnel. All home oxygen coordinators and oxygen supply and delivery personnel must be licensed. The home oxygen coordinator and oxygen supply and delivery personnel for residential settings where oxygen is used shall be required to ask the recipient a series of Fire Department prepared questions to assess the fire risk potential of the dwelling. This questionnaire is available from the Denver Fire Department. The home oxygen coordinator or oxygen supply and delivery personnel shall demonstrate to the patient the proper use techniques, instructions in safe use of the equipment, and provide educational and/or warning information for patients and caregivers on the hazards of smoking while oxygen is in use. The home oxygen coordinator or oxygen supply and delivery personnel shall submit the completed questionnaire to the Fire Marshal's Office.

CHAPTER 80

REFERENCED STANDARDS

Chapter 80 REFERENCED STANDARDS is amended as follows:

NFPA Standards listed in Chapter 80 are replaced as follows:

NFPA Codes and Standards – 2013 Edition Volumes 1 through 18	National Fire Protection Association Battery March Park Quincy, MA 02269
NFPA 13– 2016 Edition	Standard for the Installation of Sprinkler Systems
NFPA 13R – 2016 Edition	Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies
NFPA 13D-2016 Edition	Standard for the Installation of Sprinkler Systems in One- and Two- Family Dwellings and Manufactured Homes
NFPA 20 – 2016 Edition	Standard for the Installation of Stationary Pumps for Fire Protection
NFPA 72 – 2016 Edition	National Fire Alarm and Signaling Code

Standard references are to specifically enumerated sections as described in this code.

NFPA 70 (as adopted by the State of Colorado)	National Electrical Code
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Exception: The following NFPA documents are recommendations and do not serve as standards for the City of Englewood.

1000	Fire Service Professional Qualifications Accreditation and Certification System - 2006
1061	Public Safety Telecommunicator Qualifications - 2007
1201	Providing Emergency Services to the Public - 2004
1221	Communications, Emergency Services - 2007
1250	Emergency Service Organization Risk Management - 2004
1500	Fire Department Occupational Safety and Health Program - 2007
1561	Emergency Services Incident Management System - 2008
1581	Fire Department Infection Control Program - 2005
1582	Medical Programs for Fire Departments - 2007
1583	Health-Related Fitness for Fire Department Members - 2008
1710	Career Fire Departments, Organization and Deployment - 2004

REFERENCED STANDARDS

Addition: Reference the following standards:

ANSI	American National Standards Institute 25 W 43 rd Street, Fourth Floor New York, NY 13045
A10-4 – 2007	Safety Requirements for Personnel Hoists and Employee Elevators
ANSI/ASHRAE 15– 2004	Safety for Refrigeration Systems
ASCE	American Society of Civil Engineers 101 Constitution Avenue NW Washington, D.C. 20001
ASCE 21 Standards	Automated People Mover (as adopted by the State of Colorado – Parts 1 through 4, as amended by ASCE)
ASME	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016-5990
ASME A17.1/CSA B44	Safety Code for Elevators and Escalators (as adopted by the State of Colorado)
ASME A17.3	Safety Code for Existing Elevators and Escalators (as adopted by the State of Colorado)
ASME A18.1	Safety Standard for Platform Lifts and Stairway Chair Lifts (as adopted by the State of Colorado)
ASME A90.1 - 2009	Safety Standard for Belt Manlifts
ASME B20.1 - 2012	Safety Standard for Conveyors and Related Equipment
ASME B31	Standard for Pressure Piping
Chlorine Manual 6th printing — 2000	National Chlorine Institute 1300 Wilson Boulevard, Suite 525 Arlington, VA 22209

Addition: Reference the following standard:

Institute of Makers of Explosives
1575 I Street N.W., Suite #550
Washington, D.C. 20005

Addition: Reference the following standards:

Pamphlet 1 Construction Guide for Storage Magazines - 2006

Pamphlet 3 Suggested Code Regulations - 2003

Handbook for the Transportation and Distribution of Explosive Materials - 2007

Pamphlet 17 Safety in the Transportation, Storage, Handling and Use of Explosives - 2007

Pamphlet 20 Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the
Use of Electric Blasting Caps - 2001

Pamphlet 21 Destruction of Commercial Explosives

Pamphlet 22(b) IME Standard for the Safe Transportation of Class C Detonators (Blasting Caps) in
a Vehicle with Certain Other Explosives (1995)

Pamphlet 23 Recommendations for the Transportation of Explosives, Division 1.5, Ammonium Nitrate,
Emulsion, Division 5.1, Combustible Liquids, Class 3, and Corrosives, Class 8 in Bulk
Packaging - 2007

Deletion: IEC

APPENDICES

APPENDIX ADOPTION STATUS

IFC APPENDICES STATUS OF APPENDICES ON ADOPTION

All Chapters and Sections of this Appendix are adopted as part of this Code except for those that are deleted in this summary. Those that are amended or added shall also be adopted as part of this Code.

APPENDIX	TITLE	STATUS
A	Board of Appeals	Delete
B	Fire-flow Requirements for Buildings	Adopt as Amended
C	Fire Hydrant Locations and Distribution	Adopt as Amended
D	Fire Apparatus Access Roads	Delete
E	Hazard Categories	Adopt as Reference
F	Hazard Ranking	Adopt as Code
G	Cryogenic Fluids—Weight and Volume Equivalents	Adopt as Reference
H	Hazardous Materials Management Plan (HMMP)	Adopt as Reference
I	Fire Protection Systems—Noncompliant Conditions	Adopt as Reference
J	Building Information Sign	Delete
K	Construction Requirements for Existing Ambulatory Care Facilities	Delete
L	Requirements for Fire Fighter air Replenishment systems	Delete
M	High-rise Buildings – Retroactive Automatic sprinkler Requirements	Delete
N	Shop Drawing and System Graphic Requirements for Permit Application	Adopt as Code

APPENDIX B

FIRE-FLOW REQUIREMENTS FOR BUILDINGS

SECTION B104 FIRE-FLOW CALCULATION AREA

Section B104.1 General is replaced as follows:

B104.1 General. The fire-flow calculation area shall be the total area of all floor levels within the exterior walls, and under the horizontal projections of the roof of a building, except as modified in IFC Section B104.3. In buildings with mixed construction types as defined in IBC, the fire-flow calculations shall follow the method described in the *2015 International Fire Code Commentary*.

Section B104.4 is added as follows:

Section B104.4 Fire Flow Data. For new building construction or addition, each set of construction drawings submitted for permit shall contain the required fire flow calculation as follows:

Fire Flow Data Block

TOTAL FIRE FLOW REQUIRED FOR THIS SITE IS _____ GPM MINIMUM @ 20 PSI RESIDUAL PRESSURE.

THIS FLOW MUST BE PROVIDED FROM A MINIMUM OF _____ FIRE HYDRANTS.
EACH FIRE HYDRANT SHALL SUPPLY A MINIMUM OF 1500 GPM @ 20 PSI RESIDUAL PRESSURE AT THE HYDRANT OUTLET TO BE ACCEPTABLE.

CODE USED FOR ANALYSIS: 2015 IFC WITH 2016 AMENDMENTS

OCCUPANCY GROUP(S):

CONSTRUCTION TYPE(S):

FIRE FLOW CALCULATION AREA:

THIS BUILDING **IS/IS NOT** FULLY PROTECTED WITH AN AUTOMATIC SPRINKLER SYSTEM.

SECTION B105 FIRE-FLOW REQUIREMENTS FOR BUILDINGS

Section B105.1 One- and two-family dwellings, Group R-3 and R-4 buildings and townhouses is replaced as follows:

B105.1 One-and-two-family dwellings, Group R-3 and R-4 buildings and townhouses. The minimum fire flow and flow duration for one-and-two-family dwellings, Group R-3 and R-4 buildings and townhouses shall be as specified in IFC Table B105.1(2). All hydrants, new and/or existing shall flow no less than 1,500 gpm with a minimum residual pressure of 20 psi.

Table B105.1(1) is deleted.

Section B105.2 Buildings other than one- and two-family dwellings is replaced as follows:

B105.2 Buildings other than one- and two-family dwellings. The minimum fire flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in IFC Table B105.1(2).

Exception: A reduction in required fire flow of up to 50 percent, as approved, is allowed when the building is protected throughout with an automatic fire sprinkler system installed in accordance with NFPA 13 or NFPA 13R. The resulting fire flow shall not be less than 1,500 gallons per minute (5,678 L/min) for the prescribed duration as specified in Table B105.1(2). All hydrants, new and/or existing shall flow no less than 1,500 gpm with a minimum residual pressure of 20 psi.

Table B105.2 is deleted.

APPENDIX C

FIRE HYDRANT LOCATIONS AND DISTRIBUTION

Delete without substitution.

IFC Appendix C Table C102.1, Footnotes f and g are deleted.

Section C106 is added as follows:

SECTION C106

WATER MAINS SERVING FIRE HYDRANTS

C106.1 Water mains serving fire hydrants. Water mains supplying fire hydrants, fire protection systems, and building fire flows shall be sized to provide fire flows for required fire hydrants. Water mains supplying fire hydrants shall be installed as required by the City of Englewood Utilities Department.

APPENDIX N SHOP DRAWING AND SYSTEM GRAPHIC REQUIREMENTS FOR PERMIT APPLICATION is added as follows:

APPENDIX N
SHOP DRAWING AND SYSTEM GRAPHIC REQUIREMENTS FOR
PERMIT APPLICATION

SECTION N101
GENERAL

N101.1 Scope. All documents submitted for approval of any permit application shall bear the stamp, signature and registration number of the responsible design professional in accordance with the requirements below or as permitted by City of Englewood Fire Marshal's Office. In all cases, acceptance of any permit application shall be subject to the discretion of the fire code official for further review as necessary. Submitted drawings shall be of a minimum drawing sheet size of 24 inches by 36 inches and of sufficient detail and legibility to effect an adequate review of the scope of the work for which a permit is requested.

SECTION N102 – Reserved.

SECTION N103
TECHNICAL REQUIREMENTS

N103.1 Sprinkler system shop drawings submittal.

1. Two (2) complete sets of working plans shop drawings shall be submitted in accordance with Section N103.2.2, Items 1 through 20, IFC Section 903, as amended, and NFPA 13, Chapter 23. Shop drawings shall identify the flow and reduced pressures required by Section 903.3.5 used in the hydraulic calculations. Hydraulic calculations and equipment cut sheets are required. Drawings shall be stamped and signed by a Colorado licensed professional engineer. City of Englewood Water flow test certificate or hydraulic model letter shall be provided with all submittals.
2. Pre-action sprinkler and clean agent suppression systems shall include the requirements for the suppression and detection system in a single permit application. Separate permits are required for fire detection and sprinkler/clean agent installations.
3. Submittal shall include central station monitoring company name and central station license number.
4. Upon submittal of sprinkler system shop drawings, an applicant may request issuance of a "conditional sprinkler installation permit" (conditional permit). Conditional permits shall not include installation of any fire pump or pump controller components or installation of sprinklers in fittings. Conditional permits are subject to payment of all Building Department permit fees associated with the total scope of work in addition to a Fire Permit fee. Separate payment for the Fire Permit is required at the time of permit issuance at the Building Department. Work under a conditional permit is subject to subsequent plan review and field inspection for proper and code compliant installation. Corrections identified in the field or by design plan review shall be the responsibility of the contractor. Conditional permits shall only be issued to contractors with the appropriate City of Englewood contractor license.

5. Dry sprinkler system designs shall include water delivery time calculations where required by NFPA 13, 7.2.3.

N103.2 Fire Permit- sprinkler system "small scope of work" procedures. Review of the following permit applications shall be provided for the modification of existing wet fire sprinkler systems only. The maximum number of permits reviewed or issued for any single applicant shall be limited to two (2) per month. Where shop drawings are required, they shall be stamped and signed by a Colorado licensed professional engineer responsible for the design and submittals shall be in compliance with the relevant codes adopted by the City of Englewood.

N103.2.1 Project requirements for sprinkler small scope of work Fire permits. The project scope is limited to; relocating, adding and plugging sprinklers in accordance with the following:

1. Tenant finish work on an existing sprinkler system involving both sprinkler relocations and additions in a light hazard occupancy for up to 15 sprinklers.
2. Tenant finish work on an existing sprinkler system involving both sprinkler relocations and additions to Ordinary Group 1 and Group 2 Hazards, up to 10 sprinklers in other than Group H occupancies as defined in the International Fire Code.
3. Tenant finish in warehouses where tenant finish is within the office only, in accordance with Item 2 above.
4. For tenant work on all light hazard existing sprinkler systems involving sprinkler relocations and additions, the contractor shall ensure that not more than two (2) sprinklers are fed from any 1" outlet in the new construction area. A maximum of 20 added sprinklers are permitted per zone or floor level. Where the design requires more than two (2) sprinklers to be fed from a 1" outlet, hydraulic calculations shall be provided to ensure the friction loss permits adequate flow for the required design area demand. Full floor layout showing all sprinkler locations and pipe sizes shall be submitted.

N103.2.2 Plan submittal - Required information for sprinkler permit. Two (2) complete sets of shop drawings showing all floors that are affected including:

1. Name of owner and occupant
2. Location, including street address
3. Point of compass
4. Full height cross-section, or schematic diagram, if required for clarity, including ceiling construction and method of protection for nonmetallic piping
5. Location of partitions
6. Location of firewalls
7. Building construction type and occupancy classification
8. Location and size of concealed spaces, closets, attics, and bathrooms

9. Sources of water supply with pressure or elevation
10. Make, type, temperature, coverage characteristics, nominal orifice size and K-factor of sprinkler heads. Method of protection for nonmetallic piping.
11. Location of high-temperature sprinklers
12. Total area protected by each system on each floor
13. Pipe type and schedule of wall thickness
14. Nominal pipe size and cutting lengths of pipe (or center-to-center dimensions)
15. Location and size of riser nipples
16. Type of fittings and joints and location of all welds and bends. The contractor shall specify on drawings any sections to be shop welded and the type of fittings or formations to be used
17. Type and locations of hangers, sleeves, braces and methods of securing sprinklers when applicable
18. Layout identifying sizes and locations of existing piping serving the affected floor or area
19. Pipe schedule system justification where such systems are permitted by NFPA 13, Chapter 23

N103.3 Fire Permit- Fire alarm system shop drawings submittal. Where shop drawings are required, they shall be stamped and signed by a Colorado licensed professional engineer. Two (2) complete sets of shop drawings shall be submitted for permit application in accordance with this Section and with the following information:

Upon submission of fire alarm shop drawings for review, an applicant may request issuance of a fire alarm "conduit only rough-in" installation permit without approved submitted plans. The contractor shall be responsible for all changes required by the subsequent plan review. A conduit only rough-in permit may only be issued to a contractor with a valid City of Englewood electrical or electrical signal contractor's license, in accordance with this section. Only back boxes, conduit stubs and fire alarm raceway systems are permitted for installation with a conduit only rough-in permit. Conduit only rough-in permits are subject to payment of all Building Department permit fees associated with the total scope of rough-in work in addition to a Fire Permit fee. Payment is required at the time of permit issuance at the Building Department. Raceway systems shall only be installed by State and City licensed electrical contractors who are also licensed by the City of Englewood. Work under a conduit only rough-in permit is subject to subsequent plan review and field inspection for proper and code compliant installation. Corrections identified in the field or by design plan review shall be the responsibility of the contractor. Permits shall only be issued to contractors with the appropriate licenses.

N103.3.1 Fire alarm shop drawings shall contain the following information:

1. Exact address, including building and unit numbers; location of work; name and address of responsible design agency.
2. Building occupancy classifications and occupant loads for each occupancy classification.
3. Manufacturers' specification sheets for all equipment, equipment, appliances and devices.
4. Code reference used as a basis of design, including any administrative modifications or Board of Appeals decisions.
5. Identification of system as code-required, non-required code-compliant or user-defined.
6. Complete sequence of operation input/output matrix with initiating events (input) as the rows and response events (output) as the columns.
 - a. Initiating events shall include (per zone(s) per floor):
 - 1.) Manual initiation of alarm or supervisory features

- 2) Automatic initiation by detection, e.g., smoke, heat, fire, other emergency alarms; devices activating specific mechanisms or life safety functions, such as individual smoke control components, elevator recall, opening protection, etc., shall be identified separately; devices in elevator shafts, elevator machine rooms, stair enclosures shall be identified separately.
- 3) Manual initiation of special extinguishing systems; devices shall be identified separately per system per zone.
- 4) Automatic initiation of fire suppression systems; flow switches and special suppression systems shall be identified separately.
- 5) Functions monitored by the fire alarm system, including but not limited to:
 - a) Equipment/device/appliance/system trouble
 - b) Equipment/device/appliance/system supervisory shall be listed per zone
 - c) Equipment/systems monitored for integrity; identify each system separately
 1. Elevator shunt trip power
 2. RES system power
 3. FACP and ancillary equipment power
 4. Refuge area communication power
 5. Emergency firefighter communication system(s)
- b. Response events shall include:
 - 1) System alarm and system/component supervisory and trouble.
 - 2) Alarm notification including signal transmission to central station, interior and exterior appliances, voice evacuation, special suppression pre-discharge alarms, etc.
 - 3) Required safety functions including (not limited to):
 - a) Elevator recall (list groups or banks separately)
 - b) Smoke control fan activation (list each fan separately)
 - c) Damper activation (list smoke control and opening protection separately per zone per floor)
 - d) Activation of other opening protection (list separately per zone per floor)
 - e) Activation of all electronic access control functions controlled by the fire alarm (list per zone per floor)
 - f) HVAC system shutdown
 - g) Power shunt; list each component/feature/system separately (entertainment visual and audio features and increasing general illumination levels may be listed together per fire area)
7. Identification of air-handling units with airflow exceeding 2,000 cfm (.94 cu m/s) and 15,000 cfm 7.08cu m/s).
8. Identification of air-handling units used for smoke control.
9. Voltage-drop calculations using either the component-by-component method or aggregating the entire load at the end of the circuit. The calculations shall use the listed RMS current draw at 20.4volts for new systems. The voltage on a circuit shall not drop

below 16 volts at the last appliance. The "R" values used for conductors shall be in accordance with NFPA 70 (NEC) for uncoated copper conductors. Voltage-drop calculations for additional devices on existing system shall be done in the same manner with the same values, as the original calculations for the system.

10. Battery calculations for control panels and power supplies. Calculation shall include 20% de-rating.
11. Scale drawings of each area where work on the fire alarm system is proposed, including north arrow, building address and local street intersections. The drawings shall show the locations of all equipment, appliances, and devices including existing components and end-of-line resistors, room identification by number and function, attic and ceiling details for areas with automatic detection.
12. Mounting heights of wall-mounted devices.
13. Symbol list with quantities of each device. Symbols shall comply with NFPA 170.
14. Power supply connection details. System single-line riser showing all devices.
15. A separate single line drawing of the power supplies, pre-amps, amplifiers, interconnecting wiring, and methods used to provide survivability of the voice evacuation system.
16. Fire alarm circuit identification, in accordance with NFPA 72, including wire color code.
17. Interconnection wiring.
18. Supervising station designation (Central, Proprietary, Remote).
19. Full-scale drawings of annunciators, zone maps and firefighter's smoke control panels.
20. Reflected ceiling plan, where full smoke detection is provided.
21. Conduit-fill calculations
22. List of control unit bypass features
23. Amplifier load calculations and audio circuit loading (not to exceed manufacturer's maximum circuit dB loss)
24. Name, address and contractor license number of supervising station. Facilities monitoring radio communication systems shall meet connectivity requirements of Section 917.
25. Fire and smoke construction ratings of walls and barriers
26. Seal and signature of a Colorado registered professional engineer.

N103.4 Fire Permit- fire alarm system "small scope of work" procedures. Review of the following permit applications shall be provided for the modification of existing fire alarm systems only. The maximum number of permits reviewed or issued for any single applicant shall be limited to two (2) per month. Submittals shall be in compliance with the relevant codes adopted by the City of Englewood. Fire alarm permit applications for small scope of work shall be in accordance with the following:

- a. Circumstances under which permit applications may be submitted:
 1. New equipment, devices and/or appliances connected to existing fire alarm systems in other than Group H and I occupancies. Installation shall be limited to a maximum of ten (10) new or relocated notification appliances on a single floor and the addition of six (6) new or relocated initiating devices on an existing circuit. Initiating devices connected to access control systems or installed in battery rooms are not eligible for walk-through review.
 2. Transferring existing monitoring companies
 3. Removal and reinstallation of a device in the same location

4. Installing a new replacement dialer or communicator, or reprogramming same to new central station.
5. Emergency fire alarm panel replacement for an existing system. An emergency panel replacement permit shall be acquired within one (1) normal business day of the commencement of work. The proposed panel shall be compatible with the fire alarm system. A complete application in accordance with Section 907.1.2 shall be submitted within ten (10) normal business days of the commencement of work. The emergency replacement panel is subsequently subject to the requirements for a planned replacement panel.

N103.4.1 Plan submittal - Required Information for fire alarm permit. Two (2) complete sets of plans shall be submitted that include the following (as applicable):

1. Completed permit application
2. Building code occupancy classification
3. Manufacturers' specification sheets and equipment listing sheets for new equipment and devices
4. Installation codes and standards used
5. Type of system and reason system is provided (required, non-required)
6. Sequence of operation
7. Identification of duct detectors in air-handling units exceeding 2,000 cfm (0.94cu m/s) (not required in VAV boxes less than 2000cfm (0.94cu m/s) each, but aggregate air flow exceeding 2000cfm (.94cu m/s) boxes served by central fan system)
8. Voltage drop calculations and battery calculations
9. Description of annunciation assignments (complete zone schedule)
10. Shop drawings, drawn to scale, including a drawing for each building level involved, with a north arrow for compass orientation and depicting all control and annunciation panels and peripheral devices. Shop drawings shall bear the seal and signature of a professional engineer licensed by the State of Colorado.
11. Plan for upgrading existing annunciator panel, if applicable
12. One-line diagram showing scope of work and identifying new devices
13. Site address, identification of each room's usage, and areas having automatic detection
14. Provide building details (i.e., attics, ceiling cavities, etc.)
15. Mounting heights for manual fire alarm boxes and strobes
16. Primary power supply connection details and symbol list

N103.5 Building plans for graphic map. Plans shall be of durable construction, easily readable in normal lighting, protected by a smooth, transparent, plastic surface and shall include every building level including mezzanines and roofs. Plans shall contain the following information as applicable:

1. Building name
2. Building address
3. Construction type(s)
4. Scale
5. North orientation arrow
6. **"You Are Here"** in contrasting and bold font
7. Latest date plans were drawn/revised
8. Floor plans
9. Concealed spaces below floors and above ceilings; e.g., crawl spaces and attics

10. Site plan
11. Adjacent streets
12. Local fire hydrants
13. Major uses, e.g., kitchens, restaurant, offices, Gymnasium, parking, etc.
14. Areas of emergency function, e.g., areas of refuge, fire command center
15. Utility areas, e.g., electrical/telephone rooms/closets, water entry
16. All stair enclosures with distinct designation for each, matching floor signage
17. All elevators with distinct designation for each and associated machine rooms
18. All trash/linen chutes
19. All utility shafts including HVAC and light wells
20. All interior and exterior utility (communication, electricity, gas, water, etc.) shutoff locations
21. Locations of hazardous materials such as:
 - a. Control areas
 - b. Fuel storage
 - c. Battery rooms
 - d. Medical gas rooms
 - e. Emergency and standby power equipment locations
 - f. Fuel fill location
 - g. Identify fuel type and tank size
22. Sprinkler zones
23. All control valve locations including elevators and paint booths
24. Standpipe outlet locations
25. Special suppression systems; e.g., FM-200; UL-300; pre-action
26. Specialized fire protection equipment; e.g., water tanks
27. Fire pump location
28. Fuel fill location for diesel pumps
29. Identify fuel type and tank size as applicable
30. Fire department connections
31. Pump test headers
32. Wall hydrants as applicable
33. Smoke control zones
34. Fire-resistance-rated construction, fire walls, fire barriers, fire partitions, smoke barriers, smoke partitions
35. All initiating devices including water flow
36. Fire alarm zones
37. NAC power extender locations
38. Roof plan
 - a. Access
 - b. Vents
 - c. Occupied areas
39. Stamp and signature of a professional engineer licensed by the State of Colorado
40. Control areas in accordance with IFC Section 5003.8.3
41. Other features required by the Fire Code Official

N103.6 Shop drawing submittals (deferred submittal) for smoke control systems. Two (2) complete sets of shop drawings, stamped and signed by a Colorado licensed professional engineer, shall be submitted for permit application with the following information:

1. Code reference used as a basis of design.
2. Plans identifying each smoke control zone including a listing of smoke control equipment (fans) associated with each respective zone. A combination of vertical (section) and/or horizontal (plan) views may be necessary to clearly depict each zone.
3. Certification of coordination of sprinkler, smoke control and fire alarm/detection zones.
4. Plans identifying control equipment including wiring diagrams and tubing schematics as applicable
5. Manufacturers' specification sheets for all equipment and devices associated with the smoke control system including, but not limited to, the following: Fans, dampers, louvers, CT switches, end-switches, pressure sensors, control tubing, etc. Fan and damper specifications shall include operating temperature to 250° F., minimum number of fan drive belts required for load and number of belts provided. 1.5 x the minimum drive belts required shall be installed.
6. Detailed description of the required testing criteria in Section 909.10.2.. Printed reports must be maintained on site in the fire command center.
7. Final acceptance testing plan indicating systems testing. Refer to Section 909.10.1.

N103.6.1 Firefighter's smoke control panel (FSCP). Firefighter's smoke control panel submission shall bear the stamp and signature of a professional engineer licensed by the State of Colorado and shall incorporate the items below as well as a complete sequence of operation for all activation modes.

N103.6.1.1 The following features shall be incorporated and color-coded as follows:

1. General building layout (black lines on white background)
2. Exhaust systems – RED
3. Pressurization systems – GREEN
4. Garage supply and exhaust systems shall be energized manually to purge smoke (ON –AUTO only). System need not be connected to emergency power. The status of smoke control equipment shall be indicated by LED lamps and appropriate legends. Fans, major ducts and dampers within the building that are components of the smoke control systems shall be clearly identified as to purpose (e.g., "**STAIR PRESSURIZATION FAN**") on the FSCP. Lettering shall be 16 point Helvetica bold; equipment identification (e.g., "SPF-1") shall be 12 point Helvetica bold.

N103.6.1.2 LED status indicators shall be provided for each component of the smoke control system as follows:

1. Fans operating, dampers open, power on – GREEN
2. Fans off, dampers closed – YELLOW
3. Fans and dampers fault status – YELLOW
4. Duct detectors as required in accordance with IFC Section 907.3.1, as amended, shall be identified – YELLOW
5. Provide lamp test with momentary contact push button(s) to illuminate all LED's simultaneously.
6. All status LED's shall be active all the time.

N103.6.1.2.1 Monitoring for fault status for pressurization and smoke removal fans shall include:

- a. Loss of power to the fan.
- b. Open electrical disconnect at pressurization and smoke removal fan, whether the fire alarm system is in alarm or not.
- c. Fan fails to move air by program or switch on FSCP.

N103.6.1.2.2 When the fire alarm system is not in alarm, moving a switch on the firefighters smoke control panel out of the "auto" position shall, in addition to the fault light, cause a supervisory signal to the FACP.

N103.6.1.3 The FSCP shall provide control capability over all smoke-control system equipment within the building. Control switches are active only during an alarm condition except through a secured and supervised bypass method approved by the Fire Department.

1. ON-AUTO-OFF control over each individual piece of operating smoke control equipment that can also be controlled from other sources within the building. This includes; stairway pressurization fans, smoke exhaust fans, supply, return and exhaust fans, elevator shaft pressurization fans and other operating equipment used or intended for smoke control purposes.
2. OPEN-AUTO-CLOSE control over individual dampers relating to smoke control and that are also controlled from other sources within the building.
3. ON-OFF or OPEN-CLOSE control over smoke control and other critical equipment associated with a fire or smoke emergency and that can only be controlled from the firefighter's control panel.

Exceptions:

1. Complex systems, when approved by the fire code official, where the controls and indicators are combined to control and indicate all elements of a single smoke zone as a unit.
2. Complex systems, when approved by the fire code official, where the control is accomplished by a computer interface using plain English commands.

N103.6.2 Control action and priorities. The firefighter's control panel actions shall be as follows:

1. ON-OFF and OPEN-CLOSE control actions shall have the highest priority of any control point within the building. Once issued from the firefighter's control panel, no automatic or manual control from any other control point within the building shall contradict the control action. Where automatic means are provided to interrupt normal, non-emergency equipment operation or produce a specific result to safeguard the building or equipment (i.e., duct freeze stats, duct smoke detectors, high-temperature cutouts, temperature-actuated linkage and similar devices), such means shall be capable of being overridden by the firefighter's control panel. The last control action as indicated by each firefighter's control panel switch position shall prevail. In no case shall control actions require the smoke control system to assume more than one configuration at any one time.

Exception: Power disconnects required by the NFPA 70 (NEC).

2. Only the AUTO position of each three-position fire-fighter's control panel switch shall allow automatic or manual control action from other control points within the building. The AUTO position shall be the normal, non-emergency, building control position. Where

a firefighter's control panel is in the AUTO position, the actual status of the device (on, off, open, closed) shall continue to be indicated by the status indicator described above. When directed by an automatic signal to assume an emergency condition. All devices and indications shall assume the position required by the sequence of operations. In no case shall control actions require the smoke control system to assume more than one configuration at any one time.

3. Manual operation of any control switch from the "AUTO" position shall command the selected equipment to assume the position/operation required. Indicator lights shall register the appropriate change in state. When returned to the "AUTO" position while still in alarm mode, the equipment shall remain in the mode demanded by the last manual command.

N103.6.3 System response time. Smoke control system activation shall be initiated immediately after receipt of an appropriate automatic or manual activation command. Smoke control systems shall activate individual components (such as dampers and fans) in the sequence necessary to prevent physical damage to the fans, dampers, ducts and other equipment. The total response time for individual smoke control systems to achieve their desired operating mode shall not exceed the following time periods:

Fan operating at desired state – 75 seconds

Damper position travel – 60 seconds

N103.7 Emergency responder radio enhancement system (RES) shop drawings: Three (3) complete sets of shop drawings bearing the stamp and signature of a professional engineer licensed by the State of Colorado and containing the following:

1. Facility address and name where applicable
2. Name and address of system design and installation contractor with installation contractor certification number
3. Stamp and dated signature of a professional engineer licensed by the State of Colorado
4. Manufacturer cut sheets for all cables, connectors, terminations, amplifiers, UPS, batteries, and antenna
5. Manufacturer's installation instructions
6. Design calculations, (Link Budget) for signal levels at each terminal point and initial input signal strength
7. Wiring riser and distribution diagrams
8. Grounding details
9. Battery calculations
10. Location of all RES equipment
11. "North" reference arrow
12. Copies of FCC authorizations
13. Grid layout and test readings in accordance with Section 510.2.1.1

N103.8 High-piled combustible storage installation drawings.

1. Two complete sets of scaled floor plans and vertical sections (as necessary) of the building showing locations and dimensions of use areas including office, battery storage, show rooms,

etc. High-piled storage areas shall be depicted and identified including usable storage height for each area. Walls used to separate piles, rack systems, arrays, etc., shall be identified as well as their functions (e.g., fire wall, fire barrier, etc.) and ratings.

2. Scaled plans of all storage arrays identifying all aisles, cross-aisles, catwalks and similar access features.
3. Means of egress in sufficient detail to substantiate compliance of all components with IFC Chapter 10, as amended. Floor plans shall be of sufficient clarity and scale to determine travel distance, dead-end corridors, aisle widths, etc.
4. Location of required fire department access doors. Height above adjacent floors, landings, grade planes, etc. shall be identified.
5. Typical scaled sections of each unique rack showing rack height, storage height, number of tiers within each rack, dimensions and locations of catwalks, bridges, pass-throughs, and transverse and longitudinal flues.
6. Fire sprinkler data sheets providing existing or new fire sprinkler design criteria.
7. Clearance between top of storage and the sprinkler deflectors for each storage arrangement.
8. Maximum pile volume for each storage array.
9. Completed Hazards Material Inventory Statement (HMIS) and Hazardous Material Management Plan.
10. Location and classification of commodities in accordance with IFC Section 3203.
11. Location of commodities which are banded or encapsulated.
12. Type and description of fire suppression and detection systems.
13. Location of all valves controlling the water supply for all standpipes and sprinklers (ceiling, in-rack, etc.).
14. A roof or reflected ceiling plan showing the types, locations and specifications of curtain boards, other draft curtains, and all active and passive smoke removal/exhaust systems.
15. Structural analysis in accordance with IBC Chapters 16 and 22. Installation and use shall be in accordance with the rack manufacturers' specifications.
16. Any additional information required by the fire code official regarding required design features, commodities, storage arrangement, fire protection, access, egress, etc., within the high-piled storage areas.

N103.9 Fire Department kitchen hood extinguishing system. Provide two (2) sets of engineered plans for the suppression system that include the following information:

1. Systems shall be UL-300 listed and compliant with NFPA 96
2. Product cut sheets (panel, nozzles, cylinders, etc.)

3. All nozzle locations
4. Location of manual pull station 10 ft. from hood and next to the exit door
5. Kitchen hood shall be zoned separately and annunciated separately to the building FACP where provided
6. One duct required for every 12 ft. of hood
7. Nozzle types and flow point calculation
8. Shop drawings signed by professional engineer licensed by the State of Colorado

N103.10 Installation or alteration of conveyances submittal procedures. Provide two (2) complete sets of shop drawings for the installation or alteration of any conveyance in accordance with Section 919. All drawing submittals shall include equipment manufacturer's specification sheets for all components and a copy of the City-approved construction floor plan with the locations of all conveyances identified. Where inclined platform lifts and stairway chair lifts are specified, the City-approved construction plans shall include dimensions of the width of the associated stairway(s). All equipment is listed and labeled for the intended application. Prior to commencing work, a licensed elevator contractor is required to submit plans for approval.

N103.10.1 New conveyance installations. The following items must be included in the plan submittal:

1. A completed Conveyance Installation or Alteration Permit Application for the proposed equipment installation.
2. **Two complete sets of layout drawing(s).** Drawings must be submitted in one (1) hard-copy format and one (1) electronically in PDF format containing the following information:
 - a. All drawings must bear the signature and seal of a Colorado registered architect and/or professional engineer responsible for the conveyance design.
 - b. Layout drawings shall be dimensional and indicate that the conveyance meets the requirements set out in the currently adopted ASME A17.1 or ASME A18.1. Any drawings not indicating the proper code edition will be returned to the contractor for correction and resubmittal.
 - c. Approved layout drawings are the property of the building owner and shall remain on site at all times.
 - d. Documentation stating that material for the car enclosure, enclosure linings and floor coverings (other than metal or glass) conform to the following:
 - 1) ASTM E 84, ANSI/UL 723, for car enclosure and the enclosure lining with a flame spread rating of 0 to 75, and smoke development of 0 to 450.
 - 2) ASTM E 648 with a critical radiant flux of not less than 0.45 W/cm² for floor covering and underlayment.

An Alteration Permit must be obtained before the car interior is installed.

- e. Layout drawing shall include a page that details the following information in Table format.
 - 1) Applicable code reference (Current adopted code or standard ASME A17.1, A18.1, ASCE 21)

- 2) Job/Contract number
- 3) Rated capacity
- 4) Rated speed
- 5) Total travel
- 6) Landings front/rear
- 7) Suspension means type (wire ropes, coated steel belts)
- 8) Suspension means size
- 9) For elevators that travel 60 ft. or more a communication system that conforms to ASME A17.1 currently adopted edition. If a Fire Command Center (FCC) is present, this communication system shall be located in the FCC. If an FCC is not provided, the location shall be field approved.
- 10) Emergency/Standby power (Generator, specify quantity of elevators able to operate simultaneously)
- 11) Identification if hoistway is pressurized
- 12) Elevator designated as fire service access elevator
- 13) Elevator platform sized to accommodate an ambulance stretcher in accordance with IBC Section 3002.4.
- 14) Top of car handrail provided

N103.10.2 All Elevators (including LU/LA's, dumbwaiters/material lifts) layout drawings shall also include the following project information:

1. Building name, address and conveyance State registration number.
2. Required clearances and basic dimensions.
3. Location of the Fire Command Center where required by this code.
4. Layout of the elevator annunciator panel where required by this code.
5. Layout of the car operating panel and hall call stations.
6. Quantity and designations of elevator(s) operational simultaneously on an emergency or standby power generator, where provided. All elevators must be manually transferrable to the emergency or standby power source.
7. Primary and alternate floor locations (as determined by FPD).
8. Conformance of the flashing fire hat signal to Section 907.3.3.5.
9. Conformance of the Fire Emergency Operation to the Building Code for pressurized shafts in accordance with Section 907.3.3.4 Exception.
10. Maximum bracket spacing (see ANSI A17.1 Section 2.23 or 3.23).
11. Estimated maximum vertical forces on the guide rails on application of the safety or other retarding device (see ANSI A17.1 Section 2.23 and 2.19.3 or 3.23).
12. In the case of freight elevators for Class B or C loading (see ANSI A17.1 Section 2.16.2.2), the horizontal forces on the guiderail faces during loading and unloading, and the estimated maximum horizontal forces in a post-wise direction on the guiderail faces on the application of the safety device (see ANSI A17.1 Section 2.23 or 3.23).
13. Size and linear weight kg/m (lb./ft) of any rail reinforcement, where provided (see ANSI A17.1 Section 2.23 or 3.23).

14. Total static and impact loads imposed on machinery and sheave beams, supports, and floors or foundations (see ANSI A17.1 Section 2.9).
15. Impact load on buffer supports due to buffer engagement at the maximum permissible speed and load (see ANSI A17.1 Section 8.2.3).
16. Total static and dynamic loads from the governor, ropes, and tension system.
17. Horizontal forces on the building structure stipulated by ANSI A17.1 Sections 2.11.11.8 and 2.11.11.9.
18. Rated speed and operating speed in the down direction.
19. Identification of welding in conjunction with work. Hot work permit is required (other than for tack welds) or may be included in elevator permit when approved; include in elevator permit scope.
20. Identification if hoistway is pressurized.

N103.10.2.1 Electric Elevators (including LU/LA's, dumbwaiters/material lifts):

1. Where compensation tie-down is applied (see ANSI A17.1 Section 2.21.4.2), the load on the compensation tie-down supports
- 2.. Maximum upward movement (see ANSI A17.1 Section 2.4.6)

N1013.10.2.2 Hydraulic elevators (including LU/LA's, Dumbwaiters/Material Lifts):

LU/LA Elevators:

1. Net vertical load from the elevator system, which includes the total car weight and rated load; plunger, cylinder, and oil; and any structural supports
2. Outside diameter and wall thickness of the cylinder, plunger and piping, and the working pressure
3. Minimum grade of pipe (ASTM or recognized standard) required to fulfill the installation requirements for pressure piping, or in lieu of a specific Igradell of pipe, the minimum tensile strength of pipe to be used for the installation (see ANSI A17.1 Section 3.19)
4. Length of the plunger and cylinder
5. Clearance between the bottom of the plunger and the bottom head of the cylinder as required by ANSI A17.1 Section 3.18.3.3

N103.10.2.3 Escalators/moving walks. Layout drawings shall, in addition to other data, indicate the following:

1. Building name, address and State registration number
2. Whether escalator to be installed indoors or outdoors
3. Maximum speed (escalators 100fpm; moving walks up to 180fpm depending on angle of inclination)
4. Angle of inclination (escalators not to exceed 30degrees; moving walks not to exceed12degrees)

5. Rise and length

N103.10.2.4 Vertical Platform Lift (VPL) and Inclined Platform Lift (IPL). Layout drawings shall, in addition to other data, indicate the following:

1. Building name, address and State registration number
2. Number for landings (stops)
3. Whether the lift is to be installed indoors or outdoors
4. Type of drive
5. Total travel (not to exceed 14ft, VPL)
6. Speed (not to exceed 30ft/min)
7. Capacity (not to exceed 750lbs)
8. Clear platform width and length (not to exceed 18sf for VPL and 12sf for IPL)
9. Type of lift controls
10. Power supply

N103.10.3 Altered conveyances (all conveyances): Layout drawings shall contain the following information:

1. A detailed list of the components that are to be altered.
2. A scope of work shall be attached to the permit application form.
3. If the scope of work includes altering of Fire Emergency Operation, the elevator contractor shall provide documentation that the current fire alarm panel is capable of fire recall or that a permit to alter/install a new fire alarm panel has been issued.
4. If the scope of work includes the interior of the car enclosure, documentation as stated above shall be provided.
5. All drawings must bear the signature and seal of a Colorado registered architect and/or professional engineer responsible for the conveyance design.

IFCA Appendix N is amended by adding Sections N103.11 and N103.12 as follows:

N103.11 Emergency alarm system shop drawings submittal. Two (2) complete sets of shop drawings shall be submitted for permit application in accordance with this Section.

N103.11.1 Emergency alarm shop drawings shall contain the following information:

1. Exact address, including building and unit numbers; location of work; name and address of responsible design agency.
2. Building code occupancy classification(s) for each area or room.
3. Manufacturers' specification sheets for all equipment, appliances and devices.

4. Code reference used as a basis of design, including any administrative modifications or Board of Appeals decisions. Type of system and reason system is being provided.
5. Installation codes and standards used.
6. Complete sequence of operation input/output matrix with initiating events (input) as the rows and response events (output) as the columns.
7. Voltage drop calculations for notification circuits and battery calculations for secondary power supply.
8. Scaled drawings of each area where work on the emergency alarm system is proposed, including north arrow, building address and local street intersections. The drawings shall show the locations of all equipment, initiating devices, notification appliances, signage, and room designations.
9. One-line diagram showing scope of work and identifying initiating devices, notification appliances, conductors, etc.
10. Symbol list with quantities of each device or equipment.
11. Primary power supply connection details and type of secondary power supply.
12. Description of connection to building fire or sprinkler alarm system.
13. Seal and signature of a Colorado registered professional engineer.

N103.12 Area of rescue assistance communication - Required information for permit.” Two (2) complete sets of plans shall be submitted that include the following (as applicable):

1. Completed permit application
2. Building code occupancy classification
3. Manufacturers’ specification sheets and equipment listing sheets for new equipment and devices
4. Installation codes and standards used
5. Type of system and reason system is provided (required, non-required)
6. Sequence of operation
7. Backup battery calculations
8. Shop drawings, drawn to scale, including a drawing for each building level involved, with a north arrow for compass orientation and depicting all call boxes, master stations and power supplies. Shop drawings shall bear the seal and signature of a professional engineer licensed by the State of Colorado.
9. One-line diagram.
10. Site address
11. Mounting heights for call boxes
12. Primary power supply connection details and symbol list