CITY OF ENGLEWOOD 2021 AMENDMENTS TO

THE 2021 EDITION OF

THE INTERNATIONAL FIRE CODE AND APPENDICES

AS PUBLISHED BY INTERNATIONAL CODE COUNCIL (ICC)

The 2021 International Fire Code and all errata to that code is hereby adopted and incorporated by reference except for the amendments to each chapter of the 2021 International Fire Code specified below.

CHAPTER 1
SCOPE AND ADMINISTRATION

SECTION 101
SCOPE AND GENERAL REQUIREMENTS

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

101.1 Title. The title of this code is and may be cited and referred to as the Fire Code, the Englewood 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 City of Englewood Fire Marshal's Office 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 Purpose. 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

Section 102.5 Application of residential code is amended by adding an exception as follows:

Exception: Other than premise identification (address), Section 102.5 shall not apply to the following:

a. Interior or exterior renovations constructed under the provisions of the *International Residential Code* to existing detached one- or two-family dwellings

b. Additions constructed under the provisions of the *International Residential Code* to existing detached one- or two-family dwellings; or

c. Demolition or removal of a one- or two-family dwelling and replacement with a single new one- or two-family dwelling constructed under the provisions of the *International Residential Code*; however, this Exception c does not apply to construction of a new structure permitted for use as an accessory dwelling unit.

Sections 102.7 Referenced codes and standards is amended by adding the following two sentences to the end of the section:

All references to the International Building Code, International Residential Code, International Existing Building Code, International Energy Conservation Code, International Fuel Gas Code, International Mechanical Code, and International Plumbing Code in this code mean the City of Englewood Commercial Building Code, the City of Englewood Residential Code, the City of Englewood Existing Building Code, the City of Englewood Energy Code, the City of Englewood Fuel Gas Code, the City of Englewood Mechanical Code, and the City of Englewood Plumbing Code. 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 15 of the National Fire Codes are standards to this code.

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

Section 102.8 Subjects not regulated by this code is replaced as follows:

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 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 102.13 Transition Rules is added:

102.13 Transition Rules. This Code and implementation of all its provisions and policies shall become effective as follows:

102.13.1 Effective date. The effective date of Chapter 1 of this code shall be the effective date of the adopting ordinance. The effective date of the remainder of this code shall be May 1, 2023. As of May 1, 2023, 100% *construction documents* for projects submitted to the Fire Prevention Division shall be designed based on this Code, except as allowed in 102.13.2 below. Projects submitted to the Fire Prevention Division as 100%

construction documents for review before May 1, 2023, may continue to use the 2019 City of Englewood Fire Code.

102.13.2 Use of the 2019 or 2022 City of Englewood Fire Code. Projects that will be submitted to the Fire Prevention Division after the effective date of the adopting ordinance, and before May 1, 2023, may use either the 2019 or 2022 City of Englewood Fire Code. For purposes of this subsection 102.13.2, a project will be considered submitted to the Fire Prevention Division when a complete set of *construction documents* has been electronically provided by the applicant through the Fire Prevention Division's web-based permitting portal (also known as ePermits through IMS)

102.13.3 Continued use of the 2019 City of Englewood Fire Code Other than Major Projects. Except for Major Projects as described in Sec. 102.13.4 below, this code shall not require changes in the *construction documents*, construction, or designated occupancy of a structure for which a lawful, unexpired permit has been issued. Subject to the timeframes in this subsection, projects submitted prior to May 1, 2023, may continue to use the 2019 City of Englewood Fire Code. Projects designed based on the 2019 City of Englewood Fire Code shall obtain permit approval within 180 days after May 1, 2023 and shall additionally obtain construction permits within 240 days (180 + 60) after May 1, 2023. Projects that do not meet the timeframes in this subsection are required to be redesigned in accordance with the 2022 City of Englewood Fire Code.

102.13.4. Continuation of the 2019 City of Englewood Fire Code for Major Projects. With the written approval of the *fire code official*, major projects established to be in design during the drafting of the new code, and that will be submitted to the Fire Prevention Division after May 1, 2023 may be reviewed and permitted under the 2019 City of Englewood Fire Code. A major project does not include: a new single family, two-family, or townhouse project designed in accordance with the IRC; a tenant improvement; nor any other project with a total valuation less than $10,000,000. A major project allowed to be reviewed and permitted under the 2019 City of Englewood Fire Code must meet the following requirements: (i) submit foundation only or the first phase of building construction drawings to the Building Permitting and Inspections Services Agency before 7/1/2023 and all phases (exclusive of deferred submittals) by 9/1/2023 (ii) obtain all permits by 12/31/2023; and (iii) begin foundation construction within 180 days of May 1. 2023. For consideration by the *building official* and *Fire Code official* the owner, or the owner's authorized agent, must submit a letter of request to the *building official and Fire Code official*, before May 1, 2023, stating:

1. Request to proceed under the 2019 City of Englewood Fire Code

2 Address and project master number of the construction project

3 Description, number of stories, floor area, occupancy, etc., of the project

SECTION 103
CODE COMPLIANCE AGENCY

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

103.1.1 Division of Fire Prevention. The Division of Fire Prevention, under the direction of the Fire Marshal, is a special operation within the Englewood Police Department. The operation is performed under the authority of the command structure within the Englewood Police department. The position of Fire Marshal 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 code official* shall have the full power to adopt, in reference to this Code, any rules, restrictions, or measures that may be advisable.

Section 103.2 Appointment is deleted.

Section 103.3 Deputies is replaced:

103.3 Deputies. In accordance with the prescribed procedures of the City of Englewood's Department of Public Safety and with the concurrence of the Chief of the Fire Department, 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
DUTIES AND POWERS OF THE FIRE CODE OFFICIAL

Section 104.1.1 Authority is added as follows:

104.1.1 Authority. The Fire Prevention Division is 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 Division is also authorized to issue permits, inspect, and enforce compliance regarding elevators and similar devices, escalators, moving walks, automated people movers (APM, also known as AGTS) according to State of Colorado Conveyance Regulations (7 Code of Colorado Regulation 1101-8), the City of Englewood Fire Code and Section 1109 and Chapter 30 of the City of Englewood Building Code at a minimum. The Division shall have the authority to investigate fire protection and other life safety systems that are disabled or not functioning. The Division shall also have the authority on behalf of the Department of Public Safety 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 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 set forth in Chapter 80.

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. It shall be unlawful for persons to interfere or cause conditions that would interfere with the *fire code official* in 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 as follows:

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 104.6.3 Fire records is replaced:

104.6.3 Fire records. The 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 years.

Section 104.6.3.1 Fire loss information is added as follows:

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 Division in writing with the dollar value of the resulting loss within ten 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 Division.

Section 104.8.2 Technical assistance is replaced in its entirety as follows:

104.8.2 Technical assistance. To determine the adequacy and permissibility of existing and proposed assemblies, facilities, materials, occupancies, processes, products, systems, and technologies attending the design, operation or use of a building, structure, premises, or appurtenances situated thereon, subject to review or inspection by the *fire code official*, the *fire code official* is authorized to require the *owner* or owner's authorized agent to provide without charge to the jurisdiction, any or all of the following technical assistance and a meaningful report including recommendations: analyses, calculations, drawings, experiments, inspections, interpretations, observations, opinions, reviews, research, and tests. Technical assistance shall be provided, and the report prepared by a qualified expert preapproved by the *fire code official*. The *fire code official* is authorized to require the report to be prepared by, and bear the stamp of, a registered design professional.

Section 104.8.2.1 Final determination is added as follows:

104.8.2.1 Final determination. The *fire code official* shall make the final determination as to whether the provisions of this code have been met.

Sections 104.9.1 Application for modification and 104.9.2 Compliance with code are added:

104.9.1 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.

104.9.2 Compliance with code. Buildings with equivalency, alternative, or modification *approved* by the *building official* and *fire code official* shall be considered conforming to the code.

Sections 104.10.3 Fire protection features and 104.10.4 Building Code are added:

104.10.3 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.

104.10.4 Building Code. Whenever the alternate material or method involves matters regulated by the City of Englewood Fire Code and City of Englewood Building Code, approvals are also subject to approval of the *building official*.

Sections 104.11 Fire investigations is replaced:

104.10 Fire investigations. The Division or the Fire Department is 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.

Section 104.10.1 Assistance from other agencies is deleted.

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

104.10.2 Authorization of City of Englewood Police Department. The City of Englewood Police Department is authorized to assist the Fire Department in any investigation when requested to do so by the Executive Director of the Department of Public Safety, the Fire Chief, or the *fire code official*.

104.10.3 Limiting access. The Fire Department 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 investigator carrying out any duties or functions, including arrest of suspects, prescribed by this Code.

Section 104.12.1.1 Scene barrier is added as follows:

104.12.1.1 Scene barrier. The incident commander 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 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 104.12.3.1 Resetting or silencing of alarms is added as follows:

104.12.3.1 Resetting or silencing of alarms. No person shall reset or silence a fire protection or life safety system unless by direction of the fire chief, *fire code official* or fire department official in charge of the incident.

Section 104.12.4 Emergency power to demolish buildings and 104.12.5 Cost recovery are added:

104.12.4 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.

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

Section 104.13 Unsafe buildings, structures or utilities and subsections are added as follows:

104.13.1 Notice and Abatement. If, after inspection by the Department, 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.

104.13.2 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 Department and shall read, in addition to other information, "**UNSAFE – DO NOT ENTER.**"

104.13.3 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*.

104.13.4 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.

104.13.5 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 Agency. 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. Permits shall be in accordance with Sections 105.1.1 through 105.6.162

Section 105.1.7 Other required permits is added as follows:

105.1.7 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 105.5 Required operational permits and all subsections are replaced as follows:

105.5 Required permits. The *fire code official* is authorized to issue operational permits for the operations set forth in Sections 105.5.1 through 105.5.160.

105.5.1 Abandoned buildings. A permit is required for abandoned and/or vacant buildings. (See Section 311 of the *International Fire Code*.)

105.5.7 Ammunition. A permit is required to store and handle ammunition, large arms and small arms.

105.5.7.1 Large arms

105.5.7.2 Small arms

105.5.24 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.

105.5.25 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.

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

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

105.5.26.2 Canopies having an area of 500 square feet or more.

105.5.27 Carbon dioxide (CO_2).

105.5.27.1 Carbon dioxide (CO_2) systems used in beverage dispensing applications. A permit is required for the use of carbon dioxide (CO_2) systems with more than 100 pounds (45.4 kg) of carbon dioxide or any system using any amount of carbon dioxide (CO_2) below grade used in beverage dispensing applications.

105.5.27.2 Carbon dioxide (CO_2) 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 (CO_2) below grade used in plant growing (husbandry) applications.

105.5.27.3 Carbon dioxide (CO_2) 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 (CO_2) in plant growing (husbandry) applications.

105.5.28 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.

105.5.29 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.

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

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

105.5.51 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.

105.5.53 Fencing posing a hazard to firefighters. When approved by the fire code official in accordance with Section 316.7, A permit is required for any fencing type that poses physical or health hazards to responding firefighters including barbed wire or fencing powered by a 12-volt direct current (DC) power source.

105.5.53 54 File search. A fee is required for the following file searches:

105.5.53.1 Fire Prevention/Hazardous materials.

105.5.53.2 Amendment packet.

105.5.53.3 Fire investigation records including videotapes.

105.5.53.4 Property records.

105.5.53.5 Inspection and permit records.

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

105.5.56 Fire department fire alarm radio transmitter (wireless communicator). 105.5.56 Fire department fire alarm radio transmitter (wireless ~~City of Englewood~~ communicator). A permit is required to install and maintain fire department fire alarm radio equipment for monitoring fire and burglar alarms.

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

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

105.5.62 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 above-ground or above-ground flammable or combustible liquid tank.
7. To change the type of contents stored in a flammable or combustible liquid tank to a material which 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**.**

105.5.76 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 m^2) or more.

105.5.81 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.

105.5.91 Lumber yards. A permit is required for the storage or processing of lumber of 100,000 board feet (8,333 cubic feet) (236 m^3) or more.

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

105.5.93 Marijuana operations.

105.5.93.1 Carbon dioxide (CO_2) enrichment process (use). A permit is required for a marijuana CO_2 enrichment process. See Section 105.5.27.2.

105.5.93.2 Compressed gas use and storage. A permit is required for the use and storage of compressed gas in a marijuana facility. See Section 105.5.38.

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

105.5.93.4 Fumigation. A permit is required for fumigation in a marijuana facility. See Section 105.5.67.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

105.5.96.1 Compressed gas.

105.5.96.2 Generators.

105.5.96.3 Hood extinguishing system.

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

105.5.108 Ozone generator. A permit is required to operate an ozone generator.

105.5.109 Pallet storage. A permit is required for indoor or outdoor pallet storage of 2,000 square feet or more.

105.5.119 Pyrotechnic special effects material. A permit is required for use and handling of pyrotechnic special effects material.

105.5.120 Pyrotechnic event. A permit is required for all pyrotechnic events.

105.5.120.1 After-hours inspection.

105.5.120.2 Use of fog machine.

105.5.120.3 Indoor/Outdoor pyrotechnic event.

105.5.120.4 Use of propane effects.

105.5.120.5 Pyrotechnic inspector during event. (Paid by promoter as after-hours inspection).

105.5.121 Pyrotechnician. A permit/certificate of fitness is required for all pyrotechnicians.

105.5.122 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.

105.5.123 Radioactive material. A permit is required to store, use or handle radioactive material.

105.5.124 Recycling facilities. A permit is required to operate a recycling facility.

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

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

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

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

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

105.5.130.5 Event within existing facility.

105.5.130.6 Plan submittal less than 14 days prior to event.

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

105.5.137 Storage containers.

105.5.137.1 Temporary – less than 180 days.

105.5.137.2 Permanent – 180 days or longer.

105.5.138 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 (566 m^3) or more total volume of scrap tires and for indoor storage of tires and tire byproducts.

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

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

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

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

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

105.5.146 Tents or temporary membrane structures. See Section 3103.2.

105.5.146.1 Tent or temporary membrane structure - not open on all sides and having an area in excess of 200 square feet.

105.5.146.2 Tent or temporary membrane structure - open on all sides and having an area of 400 square feet or more.

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

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

105.5.149 Tire storage. A permit is required for tire storage of 2500 cubic feet or more in any one control area.

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

105.5.150.1 Temporary – less than 180 days.

105.5.150.2 Permanent – 180 days or longer.

105.5.152 Underground hazardous material storage tanks. A permit is required to maintain an underground hazardous material storage tank (per tank).

105.5.153 Underground spaces. A permit is required to inspect and certify underground spaces.

105.5.154 Vacant properties. A permit is required for vacant properties.

105.5.155 Varnishes. A permit is required to store or use varnish.

105.5.156 Waste material handling plant. A permit is required to operate waste material handling plants, wrecking yards, junk yards and waste material-handling facilities.

105.5.157 Waste receptacles. A permit is required to install and maintain waste receptacles with a capacity greater than 20 cubic feet.

105.5.161 Woodworking operations. A permit is required to operate a woodworking operation that meets one of the following criteria:

1. has more than three fixed or table-mounted wood sawdust-producing pieces of equipment, or
2. has a floor area greater than 2,500 square feet, or
3. has a room or building considered to be an explosion hazard based on dust accumulations exceeding 1/8-inch or a visible dust cloud.

Section 105.6 Required construction permits and all of its subsections are replaced in their entirety as follows:

105.6 Required construction permits. The *fire code official* is authorized to issue construction permits for work as set forth in Sections 105.6.1 through 105.6.34. Permit submittals shall bear the seal and signature of the *design professional* in accordance with DORA Rules and Regulations and Appendix O.

Commented [MS1]: 105.6Replace with (The *fire code official* is authorized to issue construction permits for work as set forth in Sections 105.6.1 through 105.6.33)

The process of application, submittal, securing of the construction permit (including fees) and obtaining inspections shall comply with this code and Section 1 (Administration) of the 2022 City of Englewood Building.

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

105.6.2 Automatic fire extinguishing systems. A construction permit is required prior to the installation or modification of automatic fire extinguishing systems including firelines. Water supply infrastructure including hydrants must obtain FMO approvals via Water Plan submittals (epermits), however final permitting approved & issued by City of Englewood Water.

Work performed to keep equipment operable or to make repairs is considered maintenance and requires a permit:

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 normal business days after commencement of the emergency work. A full permit application is required within ten 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.
3. Minor work not impacting the mechanics of the system including gauge replacement, leaking sprinkler replacement (less than 3), hydraulic placard replacements, single hose valve replacement (not including PRV's), turn wheel replacements, escutcheon replacements, hangar replacements/repairs, etc.

105.6.3 Carbon dioxide (CO_2)

105.6.3.1 Carbon dioxide (CO_2) systems used in beverage dispensing applications. A construction permit is required for the installation of carbon dioxide (CO_2) systems with more than 100 pounds (45.4 kg) of carbon dioxide or any system using any amount of carbon dioxide (CO_2) below grade used in beverage dispensing applications.

105.6.3.2 Carbon dioxide (CO_2) 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 (CO_2) below grade used in plant growing (husbandry) applications.

105.6.3.3 Carbon dioxide (CO_2) 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 (CO_2) in plant growing (husbandry) applications.

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

105.6.5 Compressed gases. When the compressed gases in use or storage exceed the amounts listed in Table 105.5.38, 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.

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

105.6.7 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 and FMO policy. Two sets of specifications and accurately scaled and fully dimensioned construction plans shall be provided in accordance with Appendix O.

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. See also Section 920 for additional requirements.

105.6.7.1 Conveyance Permits. The City of Englewood Conveyance Section shall be notified by a responsible party from the conveyance contractor or the permit applicant upon the completion of the scope of work set forth in the issued and *approved* permit. Notification to City of Englewood Fire Conveyance Section shall be in written format and include the signature of the permit applicant. Notification shall include all known variances or deviations from the scope of work submitted for approval. Notification shall be submitted prior to or on the expiration date of the issued permit. If for any reason the original permit applicant is unable to complete the scope of work specified in the permit and the work is to be completed by a contractor other than the original, a new permit must be applied for and obtained by the conveyance contractor who will complete the specified scope of work.

105.6.8 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 system where the system capacity exceeds the amounts listed in Table 105.5.42. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

105.6.9 Energy storage systems. A construction permit is required to install energy storage systems regulated by Section 1207

105.6.10 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 requires a construction permit. Construction permits are required for any work to the following systems:

1. Emergency alarm systems.
2. Emergency communication systems (ECS).
3. Mass notification systems.
4. Public safety radio communication systems (RES).
5. Two-way communication systems.
6. Gas detection systems.

Exceptions:

1. 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 normal business days after commencement of the emergency work. A full permit application is required within ten 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 may not require a permit.

105.6.11 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 requires 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 normal business days after commencement of the emergency work. A full permit application is required within ten 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.
3. Minor work not impacting the mechanics of the systems including gauge replacement, driver oil/lube job, hydraulic placard replacements, light bulb replacement, battery replacement, fuel treatment, packing adjustments, etc.

105.6.12 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.

105.6.13 Gates and barricades across fire apparatus access roads. A construction permit is required for the installation of or modification to a gate or barricade across a *fire apparatus access road*.

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

105.6.14.1 Fuel Oil

105.6.14.2 Natural Gas

105.6.15 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 105.5.71.

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.

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

105.6.17 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.

105.6.18 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.

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

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

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

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

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

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

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

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

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

105.6.26 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.

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

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

105.6.29 Smoke control systems. A construction permit is required for the installation, modification, or removal from service of a smoke control system, including fans, controllers (VFD's), ductwork, fire/smoke dampers, annunciators, and associated controls. Work performed to keep equipment operable or to make repairs is considered maintenance and requires 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 normal business days after commencement of the emergency work. A full permit application is required within ten 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.
3. Minor repair work not impacting the safety fucntion, infrastructure or software of the system such as like for like replacement of damper acutatuor (not more than 3), damper linkage and door closures

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

105.6.31 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 requires 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 normal business days after commencement of the emergency work. A full permit application is required within ten 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.
3. Minor work not impacting the mechanics of the system such as gauge replacement, hydraulic placard replacements, single hose valve replacement (not including PRV's), turn wheel & cap replacements, hangar replacements/repairs, etc.

105.6.32 Temporary membrane structures, tents, canopies and special event structures. A construction permit is required to erect an air-supported temporary membrane structure or a tent having an area of 400 square feet (37 m^2) 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 m^2).
    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 m^2) total.
    c. A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be maintained.

105.6.33 Underground and above-ground hazardous materials storage tanks. A construction permit is required to install any hazardous materials storage tank.

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

SECTION 107
FEES

Section 107.2 Schedule of permit fees is amended by replacing it in its entirety as follows:

107.2 Schedule of permit fees. A fee necessary to cover administrative costs of inspection, licensing, record-keeping, and other requirements for all fire prevention programs under this Code shall be paid in accordance with fee schedules established by the Executive Director of the Department of Public Safety.

SECTION 108
INSPECTIONS

Sections 108.2.3 Dangerous or hazardous conditions or material through 108.2.13 Townhomes, condominiums and apartments are added as follows:

107.2.3 108.2.3 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.

107.2.4 108.2.4 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.

107.2.5 108.2.5 Emergency. As used in Section 108.2.4, "emergency" means circumstances that the *fire code official* knows, or has reason to believe, exist and can constitute immediate danger to life and property.

107.2.6 108.2.6 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. They shall be identified by credentials issued by the Department of Public Safety.

107.2.6.1 108.2.6.1 Impersonation. Persons shall not use a badge, uniform, or other credentials to impersonate the *fire code official*.

107.2.7 108.2.7 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.

107.2.8 108.2.8 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

107.2.9 108.2.9 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.

107.2.9.1. 108.2.9.1 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.

107.2.10 108.2.10 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.

107.2.10.1 108.2.10.1 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.

107.2.11 108.2.11 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 and compensate through *approved* Department of Public Safety channels at a rate established by the Executive Director of the Department of Public Safety one or more firefighters of the City of Englewood, as required by the *fire code official*. Such firefighter(s) shall be subject to the *fire code official*'s orders at all times when so employed and shall be in uniform and 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.

107.2.11.1 108.2.11.1 Owner's responsibility. The owner, agent, or lessee shall employ 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 108.2.11, 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.**108.2.3 Records.** The Fire Prevention Division 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.

108.2.13 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 alarms 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 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 108.5 Frequency of Inspections is added as follows:

108.5 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 108.6 Special inspections is added as follows:

108.6 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. The fire safety inspections and systems acceptance testing shall be performed by certified City of Englewood Fire Prevention personnel. The property owner, property manager, or contractor shall reimburse the City of Englewood at the hourly rate established by Englewood Finance. Special inspections outside of normal business hours shall be a minimum of three hours Monday through Friday and a minimum of four hours on weekends and designated City holidays.

SECTION 109
MAINTENANCE

Section 109.7 Fire watch personnel, 109.7.1 Owner's responsibility and 109.7.2 Permit required are added as follows:

109.7 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.

109.7.1 Owner's responsibility. The owner, agent, or lessee shall employ personnel for fire watch in adequate numbers as determined by the *fire code official* based on the potential hazard or reduction in safety described in Section 109.7. When required by the *fire code official*, uniformed City of Englewood firefighters shall be employed through the Department of Safety and compensated at a rate established by the Executive Director of the Department of Public Safety. 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*.

108.7.2 Permit required. Permits shall be required as set forth in Section 105.5.5960 105.6.58.

SECTION 111
MEANS OF APPEALS

Section 111.1 Means of appeals is replaced in its entirety as follows:

111.1 Appeals. Either the Executive Director of the Department of Public Safety, or if delegated by the Director, a board of appeals may 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 board of appeals shall consist 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.

111.1.1 Application. Prior to any action by the Executive Director of the Department of Public Safety, an application in writing shall be filed in the office of the Director within 30 days after receiving the order, decision, or determination made by the *fire code official* on a form provided by the Director providing the necessary information required. A copy of such application shall be furnished to the *fire code official* by the applicant. Payment of the fee established by the Executive Director of the Department of Public Safety, in the form a check made payable to the City of Englewood Manager of Finance, must accompany the application.

111.1.2 Meetings and records. The Executive Director of the Department of Public Safety or Board of Appeals shall keep records of its proceedings showing the vote of each member on every question and the final decision.

111.1.3 Appeal from decision of the Executive Director of the Department of Public Safety. Any person subject to a decision of the Executive Director of the Department of Public Safety may have that decision reviewed in the manner provided by Colorado Rules of Civil Procedure.

Section 111.3 Qualifications is deleted in its entirety.

SECTION 112
VIOLATIONS

Sections 112.3.2.1 Failure to comply through 112.3.2.4 Citation are added as follows:

112.3.2.1 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 Section 1-13(a) of the City of Englewood Revised Municipal Code. It shall be unlawful to fail to pay fees authorized pursuant to this code.

112.3.2.2 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.

112.3.2.3 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.

Section 112.3.5 Administrative citation is added as follows:

112.3.5 Administrative citation. The *fire code official* is authorized to issue administrative citations for violations of this code.

Section 112.4 Violation penalties is replaced as follows:

112.4 Violation penalties. See Section 112.3.2.1 Failure to comply.

SECTION 114
UNSAFE STRUCTURES OR EQUIPMENT

Section 114.1 General is replaced in its entirety as follows:

114.1 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 official* for any repairs, alterations, remodeling, removing or demolition required. It shall be unlawful to maintain an unsafe condition in any building.

Section 114.1.1 Unsafe conditions is replaced in its entirety as follows:

114.1.1 Unsafe conditions. Structures or existing equipment that are or hereafter become unsafe, insanitary or deficient because of inadequate means of egress, inadequate light and ventilation, 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 114.1.2.1 Unsafe heating or electrical equipment and structural hazards is added as follows:

114.1.2.1 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 114.1.2.2 Unsafe operations is added as follows:

114.1.2.2 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.

Sections 115 Licenses through 118 Fire alarm monitoring – permits and licenses are added as follows:

SECTION 115
LICENSES

115.1 General. A license is authority granted to the person to whom it is issued to perform the work authorized by the license.

115.2 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.

115.2.1 Ammonia safety / alarm systems.

115.2.2 Backflow prevention for fire sprinkler systems.

115.2.3 Carbon dioxide extinguishing systems.

115.2.4 Carbon monoxide detection systems.

115.2.5 Carbon monoxide safety / alarm warning systems.

115.2.6 Central station operator.

115.2.7 Central station runner.

115.2.8 Conveyances.

115.2.9 Clean agent fire extinguishing systems.

115.2.10 Department of safety radio enhancement systems.

115.2.11 Dry chemical extinguishing systems.

115.2.12 Electrical signaling and central wiring.

115.2.13 Emergency communication systems.

115.2.14 Fire alarm systems.

115.2.15 Fire detection systems.

115.2.16 Fire doors and other opening protectives.

115.2.17 Foam extinguishing systems.

115.2.18 Fire pumps. Except: Building engineers trained by the service provider to conduct weekly and monthly churn test on fire pumps.

115.2.19 Fire sprinkler systems – NFPA 13.

115.2.21 Fire sprinkler systems – NFPA 13D.

115.2.22 Fire sprinkler systems – NFPA 13R.

115.2.23 Fire standpipe systems – NFPA 14.

115.2.24 Firefighter's emergency elevator recall systems.

115.2.25 Foam extinguishing systems.

115.2.26 Kitchen hood extinguishing systems.

115.2.27 Oxygen coordinator.

115.2.28 Oxygen supply and delivery.

115.2.29 Portable fire extinguishers.

115.2.30 Refrigerant safety / alarm systems.

115.2.31 Rubbish and linen handling systems.

115.2.32 Smoke control systems.

115.2.33 Special extinguishing systems.

115.2.34 Carbon dioxide beverage dispensing (including gas and detection/alarm).

115.2.35 Multi-family dwelling apprentice inspector.

115.3 Conveyance licensing. City of Englewood licenses shall be required for the installation, alteration, replacement, maintenance, removal, dismantling, or inspection activities of conveyances. A conveyance contractor license issued by the City of Englewood is required for installation or alteration of equipment.

SECTION 116 is added:

PUBLIC FIRE EDUCATION

116.1 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.

116.2 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.

SECTION 117 is added:

EMERGENCY PLANS AND PROCEDURES

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

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

117.3 Review. Emergency plans shall be submitted annually to the Fire Prevention Division for review.

117.4 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 in a manner *approved* by the *fire code official*. ~~The person developing/updating the emergency plans shall be certified by the City of Englewood. See Section 403.13.~~

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 liquid 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 feet. 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. A liquid ethanol mixture with greater than 16% ABV intended for human consumption including neutral or grain spirits, vodka, whiskey, gin, brandy, applejack, rum, tequila, cordials and liqueurs. Beverage spirits do not include beer, wine, or other alcohol beverages produced from fermentation.

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 *alcohol beverage production facility* (ABPF) or portion thereof, including accessory uses, in which beer or other malt liquors, 16% or less ABV, are produced by fermentation. In spirit production, beer and wash are synonymous as precursors to distillation.

BULK STORAGE FOR DISTILLING. 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, constructed of wooden staves and heads, held together by metal hoops, not equipped with provisions for emergency venting, and not intended for fixed installation. In *alcohol beverage production facilities (ABPFs)*, "barrel" is a subset of, and often used interchangeably with "cask". These vessels are used primarily for storing ethanol mixtures.

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.

Commented [MS2]: Recommend Deleting

CENTRAL FUEL-BURNING APPLIANCE ROOM. A room containing a fuel burning appliance serving multiple dwelling units, such as a boiler, fireplace, 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.

CLASS 1 LIQUIDS. Class IA, Class IB or Class IC flammable liquids. For Chapter 40, ethanol mixtures are either Class IB or Class IC flammable liquids.

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. In an *alcohol beverage production facility (ABPF)*, any closed *vessel* of 119 gallons (450 L) or less capacity used for transporting or storing *Class 1 Liquids*, not intended for fixed installation and not constructed of wood, but possibly equipped with an overpressure-relieving mechanism in accordance with FM Global Approved Standard for Plastic Plugs for Steel Drums, Class Number 6083, or equivalent.

CITY OF ENGLEWOOD BUILDING CODE. The collection of International Code Council (ICC) publications as adopted and amended by the City of Englewood excluding the *International Fire Code*, as found in Article I of this document.

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. In an *alcohol beverage production facility (APBF)*, the concentration of *ethanol* by slowly raising the temperature of an *ethanol mixture* through the boiling points of its constituents then collecting and condensing the constituent vapors separately from the remaining water.

DISTILLERY (also **DISTILLED SPIRITS PLANT – BEVERAGE).** An *alcohol beverage production facility (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, Distilled Spirits Plant –Industrial and Distilled Spirits Plant – Industrial/Beverage.

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 CH-3CH-2OH (abbreviated as C_2H_5OH or C_2H_6O).

ETHANOL MIXTURE. Liquid mixture comprised primarily of water, and also including ethanol and materials with hazards not regulated by the City of Englewood Building Code or City of Englewood Fire Code.

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 by microorganisms, 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.

HAZMAT (HAZARDOUS MATERIALS). Materials with harmful physical and health properties regulated by the City of Englewood Building Code or City of Englewood 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 a 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 in air 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 *Mechanical Code of the City of Englewood.*

MASH. During *fermentation*, the mixture of ground or cracked grains and other crushed edible organic material steeped in hot water to release carbohydrates and reduce it 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 in air of combustible dust that will propagate a flame. The MEC for grain dust is 0.055 oz/ft^3 (55 g/m^3).

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 *alcohol beverage production facility (ABPF)* used for storage, production, dispensing, blending, bottling, or handling of *Class 1 Liquids* where, for less than 50 percent of the time it is in operation, its contents are not exposed to atmosphere and vulnerable to evaporation. Processes involving *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 f*lash point*, and covered blending or maceration *vessels* are typically considered normally closed.

NORMALLY OPEN. A system or *vessel* in an *alcohol beverage production facility (ABPF)* used for storage, production, dispensing, blending, bottling, or handling of *Class 1 Liquids* where, 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. 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 and 907.1.5).

OCCUPANY CLASSIFICATION

Factory Industrial F-1 Moderate-hazard occupancy.

F-1 Beverages is amended to add the following condition:

Beverages; over 16-percent alcohol content in combustible containers.

Factory Industrial F-2 Low-hazard Occupancy.

F-2 Beverages is amended to add the following condition:
Beverages; up to and including 16-percent alcohol content in noncombustible containers

Uses other than Group H, item 18 is replaced:

18. The production and storage of alcohol beverages with concentrations by volume (ABV) up to and including 16-percent conforming to the requirements of this code.

Uses other than Group H, item 19 is deleted.

Group S-1 moderate-hazard storage.
S-1 Beverages is amended to add the following condition:
Beverages up to and including 16-percent alcohol in combustible containers

Group S-2 low-hazard storage.
S-1 Beverages is amended to add the following condition:
Beverages up to and including 16-percent alcohol in noncombustible containers

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

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).

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 item on a lower layer or 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 a 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. In an *alcohol beverage production facility (ABPF)*, 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 percent 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 process description.

PROCESSING VESSEL. In *alcohol beverage production facility (ABPF)*, 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. 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 item 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 the purpose of maintaining the Department of Public Safety 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 regulated by the fire code for which an operations permit could be required including storage and/or use of hazardous materials, LPG, combustible dust operations, etc.

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.

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* with greater then 16% ABV produced by ***distillation*** or fortification of wine, wash, beer or a previously distilled *spirit.*

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

STILL. In an *alcohol beverage production facility (ABPF)*, any appliance is which *distillation* of an *ethanol mixture* is performed. *Stills* include pots, columns, condensing coils, and the piping between them.

STORAGE AREA. An *alcohol beverage production facility (ABPF)* or portion thereof where *alcohol beverages*, *ethanol mixtures*, or materials incorporated or utilized in the manufacture of either are held for aging, awaiting transport, or subsequent handling (c.f., *use area*).

TANK. In an *alcohol beverage production facility (ABPF)*, 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. An *alcohol beverage production facility (ABPF)* or portion thereof where *ethanol mixtures* or materials incorporated or utilized in the manufacture of *alcohol beverages* or other *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).** In an *alcohol beverage production facility (ABPF)*, a *stationary tank* constructed primarily of wood.

VESSEL. In an *alcohol beverage production facility (ABPF)*, any reservoir holding – unless otherwise noted – C*lass 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 *alcohol beverage production facility (ABPF)* or portion thereof, including accessory uses, in which *wine* at 16% or less ABV is produced by fermentation.

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 105.5 for the activities or uses regulated by Section 307-Open Burning, Recreational Fires and Portable Outdoor Fireplaces; Section 308-Open Flames; Section 319 – Mobile Food Preparation Vehicles

SECTION 302
DEFINITIONS

Section 302.1 Definitions is amended to add the following term:

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 Sections 304.3.1 through 304.3.7.

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 is 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.

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 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 307
OPEN BURING, RECREATIONAL FIRES AND PORTABLE OUTDOOR FIREPLACES

Section 307.1 General is replaced as follows

307.1 General. A person shall not kindle or maintain or authorize to be kindled or maintained any open burning or *recreational fire* unless permitted by the City of Englewood Department of Public Health & Environment (DPHE) and conducted and approved in accordance with Sections 307.1.1 through 307.5.

Section 307.2.1 Authorization is deleted.

Section 307.4.3 Portable outdoor fireplaces is replaced as follows:

307.4.3 Portable outdoor fireplaces and chimeneas. Portable outdoor fireplaces and chimeneas are prohibited.

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 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 *City of Englewood Fuel Gas Code* and supplied by the building's natural gas system.
4. Listed electric ranges, grills, or similar electrical apparatus.

SECTION 309
POWERED INDUSTRIAL TRUCKS AND EQUIPMENT

Section 309.3 Battery chargers is replaced as follows:

309.3 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.

309.3.1 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.

309.3.2 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.

309.3.2.1 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.

309.3.2.2 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 Chapter 7 of the *City of Englewood Commercial Building Code*.

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.

309.3.2.3 Smoking prohibited. Smoking shall be prohibited in battery-charging areas. "No Smoking" signs shall be provided in the charging area in accordance with Section 310.3.

309.3.2.4 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.

309.3.2.5 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 309.4 Ventilation is replaced as follows:

309.4 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 309.8 Signage is added as follows:

309.8 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 311
VACANT PREMISES

Section 311.1.1 Abandoned premises is amended by removing the reference to the *International Property Maintenance Code*

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 20. When the area used for outside storage exceeds 50 feet but is less than 150 feet, in any dimension, aisles of not less than eight feet clear width shall be provided between piles. When the area used for outside storage exceeds 150 feet in any dimension, a driveway between and around piles shall be at least 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 50 feet by 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 105.5

Section 316.7.1 Electrified fences is added as follows:

316.7.1 Electrified fences. Electrified fences may be permitted by specific approval of the *fire code official*. Requirements of submission for an electrified fence shall comply with FMO policy 316-1. All fences shall be designed in accordance with Sections 1609 and 1807 of the *City of Englewood Commercial Building Code*. Only fences powered by a 12- volt direct current (DC) power source shall be considered.

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.

SECTION 317
LANDSCAPED ROOFS

Section 317.1 General is replaced as follows:

317.1 General. Landscaped roofs shall be installed and maintained in accordance with Sections 317.2 through 317.6 and Section 1505 and 1507.16 of the *International Building Code* and shall be installed in accordance with ANSI/SPRI-VF-1 and the administrative and design requirements for vegetated roofs in the Department of Community Planning & Office of Climate Action, Sustainability, and Resiliency Rules and Regulations Governing Green Building Requirements.

Section 317.1.1 Vegetative roof materials is added as follows:

317.1.1 Vegetative roof materials. In buildings of Type V, IV, III, or II-B construction, the vegetative roof materials shall contain assemblies that include modular trays or containers that do not exceed 4 square feet per tray or container, weigh no more than 180 pounds per tray or container when fully saturated and vegetated, and do not present excessive burning characteristics as evaluated by the *fire code official*.

Exception. The *fire code official* may allow vegetative roof materials that do not contain assemblies that include modular trays or containers when an *owner* can provide sufficient evidence that the landscaped roof allows firefighters or emergency responders to conduct ventilation during firefighting efforts and post-fire salvage and overhaul operations.

Section 317.3.1 Opening Protection is added as follows:

317.3.1 Opening protection. Vegetation abutting building openings shall be separated by five feet or openings shall be provided sprinkler protection per Section 903.2.11.1.4.

Section 317.6 Fire access is added as follows:

317.6 Fire access. All roofs containing vegetated areas shall be afforded access via exit stairways and fixed permanent ladders to upper roofs. The exit stairways and fixed permanent ladders to upper roofs shall be located within 230 feet from any vegetated area. Access points shall be separated by a minimum of 10 feet from the vegetated areas.

Exceptions:

1. In buildings less than 4 stories in height, exit stairways and fixed permanent ladders need not be provided, but there shall be a minimum 8-foot-wide clear perimeter around the edges of the roof.

2. In existing buildings, the *fire code official* shall approve methods of access to all vegetated areas.

SECTION 319
MOBILE FOOD PREPARATION VEHICLES

Section 319.4.1.1 Agent line valve is added as follows:

319.4.1.1 Agent isolation valve. A manual isolation valve is allowed in the extinguishing agent line to allow for safe travel, however the Operator is responsible for ensuring the extinguishing system is on-line prior to actuating any cooking appliance.

Section 319.4.2 Fire extinguisher is replaced and new subsections are added as follows:

319.4.2 Fire extinguisher. Portable fire extinguishers shall be provided in accordance with Section 319.4.2.1 through 319.4.2.2

319.4.2.1 Fire extinguisher mounting location. A 2A:10BC fire extinguisher shall be mounted in each vehicle.

319.4.2.2 Fire extinguishers for cooking operations. If grease or grease-laden vapors are produced during cooking operations, a Class K extinguisher shall also be required.

Section 319.8.1 Maximum aggregate volume is replaced as follows:

319.8.1 Maximum aggregate volume. The maximum aggregate capacity of LP-gas containers transported on the vehicle and used to fuel cooking appliances only shall not exceed 80 pounds (36 kg) propane capacity.

Section 319.8.2 Protection of container subsections are added as follows:

319.8.2.1 Trailer tongue mounting. LP-gas containers may be mounted on the A frame structure of the tongue of the trailer with propane brackets that prevent any movement.

319.8.2.2 Rear of vehicle mounting. LP-gas containers mounted on the corners or rear of the vehicle shall be enclosed in an impact resistant cage to prevent damage from vehicular accident and have the bottom of the LP-gas containers no lower than 28 inches above bumper or A-frame structure.

319.8.2.3 Ventilation. LP-gas containers installed in a compartment on the rear of the vehicle or tongue of a trailer shall be ventilated at the top and bottom of the compartment.

319.8.2.4 Access door labeling. Access hatches and doors for concealed LP-gas container storage shall be labeled with DOT-style placards with an identification code of "1075" and a decal that states "flammable".

319.8.2.5 Roof mounting. LP-gas containers shall not be mounted directly on roofs.

319.8.2.6 Front of vehicle mounting. LP-gas containers shall not be mounted ahead of the front axle on a self-powered vehicle.

Section 319.8.4.1 Gas pipe installation is added as follows:

319.8.4.1 Gas pipe installation. Installation of gas piping shall comply with all of the following:

1. LP-gas piping installed beneath the vehicle shall be painted black iron pipe with a minimum wall thickness of 0.049 inches (1.2 mm).

   Exception: *Approved* rubber coated flex connectors (UL-21 stainless steel) may be used to connect to fuel sources or to transition to a different support structure in order to isolate strain on the rigid system.

2 Flexible connector. A LP-gas flexible connector, no longer than 5 feet, shall be installed between the regulator and the LP-gas container.

3 The LP-gas flexible connector and gas valve shall not extend past the body lines of the vehicle. Gas lines should preferably be installed down the center of the vehicle and away from the tire area.

4 All piping shall be installed outside the vehicle. Piping shall be under the vehicle and below any insulation or false bottom. When piping passes through sheet metal or a structural member, a rubber grommet or equivalent protection shall be installed to prevent chafing.

5 Gas piping shall be installed to enter the vehicle through the floor directly beneath or adjacent to the appliance served.

6 If a branch line is installed in gas piping, the tee connection shall be in the main gas line under the floor and outside the vehicle.

Section 319.10.1 Exhaust system is replaced as follows:

319.10.1 Exhaust system. The exhaust system, including hood, grease-removal devices, fans, ducts and other appurtenances, shall be inspected and cleaned in accordance with Section 606.3 at the interval for high-volume cooking operations.

Section 319.10.2 Fire protection systems and devices is replaced as follows:

319.10.2 Fire protection systems and devices. Fire protection systems and devices shall be maintained in accordance with Section 901.6. Hood extinguishment systems shall be maintained and inspected in accordance with Section 904.13.5.

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 and all of its subsections are deleted in their entirety and 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 Marshal's Office 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.

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 Code Official of the evidence including what is known of the location and circumstances. Such evidence shall not be disturbed, thus preserving data for the Fire Code Official to conduct an investigation.

401.3.2 Elevator entrapment communication procedures for new, altered, and existing conveyances. 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 Code Official 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. Receive a second call from the same elevator within 5 minutes of the first call.

4. The expected authorized building or elevator contractor or technician is unable to respond within 20 minutes of the first notification of entrapment.
5. There is contact from the same stalled elevator 20 minutes after the original call indicating that help has not arrived.

401.3.3 Procedures. for new, altered, and existing conveyances, 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. For new, altered, and existing conveyances, 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 by adding the following term:

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

PROPERTY

SECTION 403

EMERGENCY PREPAREDNESS REQUIREMENTS

Section 403.11.2 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.
- Loctions of hazardous operations identified in Sec. 105.5.

Section 403.12 Facility manager certification is added as follows:

403.12 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 an *approved* training course.

CHAPTER 5
FIRE SERVICE FEATURES

SECTION 502
DEFINITIONS

Section 502.1 Definitions is amended by adding the following term:

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 be not less than a 3-foot-wide access walkway leading from fire apparatus access 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 as follows:

1.1 Where a building is equipped throughout with an *approved* automatic sprinkler system installed in accordance with Sections 903.3.1.1 or 903.3.1.2, the 150-foot dimension may be increased to 250 feet.

Section 503.2.1 Dimensions is replaced as follows:

503.2.1 Dimensions. Fire apparatus access roads shall comply with currently adopted Department of Transportation and Infrastructure *Rules and Regulations for Standard Right-of-Way Cross Sections and Utility Locations* but shall have an unobstructed width of not less than 20 feet, exclusive of shoulders. Existing fire apparatus access roads shall maintain their width but shall be not less than the minimum clear width allowed in Table 503.2.1. Alleys, service drives, drive aisles and similar driving surfaces shall not serve as *fire apparatus access roads*. *Approved* security gates shall comply with Section 503.6 and fire apparatus access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches and be open to sky without obstruction.

Exception: Low profile bikeway elements four inches or less in height are permitted in required width but shall not reduce drive lane to less than ten feet.

TABLE 503.2.1
MINIMUM CLEAR WIDTHS FOR EXISTING FIRE APPARATUS ACCESS ROADS

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	14 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
Multi-family non-high-rise buildings, four (4) or more stories OR with 16 or more dwelling units per building[3] Non-residential non-high-rise buildings/structures	20 feet with an additional 40-feet (length) of "no parking" fire lane at the main entrance of the building. Where 25 feet or greater unobstructed width is provided, a 40-foot "no parking" fire lane is not required.
High-rise buildings/structures[3]	20 feet with an additional 40 feet (length) of "no parking" fire lane at the main entrance of the building. Where building/structure is located on a corner, 20 feet is required on 2 sides of the building. Where 25 feet or greater unobstructed width is provided, a 40-foot "no parking" fire lane is not required.

[1] Based on 8-foot parking and 18-inch curb-to-tire widths in accordance with City of Englewood standards, unless a 7-foot parking lane is allowed by City of Englewood Fire when existing streets are 32 feet wide or less.
[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 providing all weather driving capabilities. Temporary fire access surfaces during construction are permitted to consist of a gravel road base or asphalt or other *approved* surface. See Section 1607.7.2 of the *Commercial Building Code of the City of Englewood* for Fire Department apparatus loading.

Section 503.2.4 Turning radius is replaced as follows:

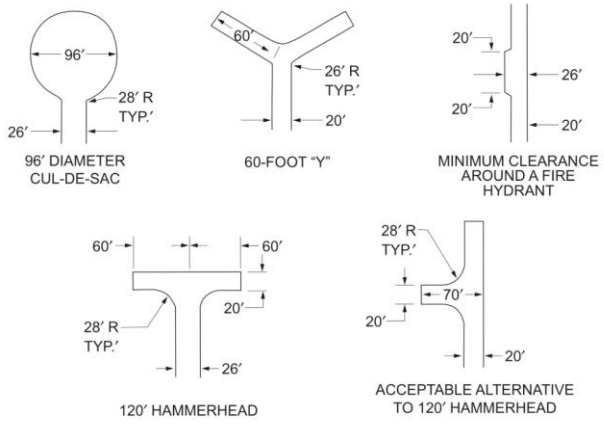
503.2.4 Turning radius. The required turning radius of a *fire apparatus access road* shall be a minimum of 23'-2" feet inside and 44'-2" feet outside.

Exception. Where *approved* by the *fire code official*, pedestrian and bicyclist facilities within existing *fire apparatus access roads* shall be permitted to reduce the minimum required turning radius dimension.

Section 503.2.5 Dead ends is replaced as follows:

503.2.5 Dead ends. Dead-end fire apparatus access roads in excess of 150 feet (45,720 mm) in length shall be provided with an *approved* area for turning around fire apparatus in accordance with Figure 503.2.5.

Figure 503.2.5 Dead-end fire apparatus access road turnaround is added as follows:



For SI: 1 foot = 304.8 mm.

FIGURE 503.2.5
DEAD-END FIRE APPARATUS ACCESS ROAD TURNAROUND

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

503.2.6.1 Grade-level structural deck. See Chapter 16 of the *Commercial Building Code* of the City of Englewood for structural loading. 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.

Section 503.2.7 Grade is replaced in its entirety as follows:

503.2.7 Grade. The grade of the fire apparatus access road shall not exceed 7 percent (4 degrees). All other criteria shall meet Transportation Engineering design criteria as specified by City of Englewood Department of Transportation and Infrastructure.

Section 503.2.8 Angles of approach and departure is replaced in its entirety as follows:

503.2.8 Angle of approach and departure. The angles of approach and departure for fire apparatus access roads shall not exceed 6 degrees or based on the manufacturer's published minimums as *approved* by the *fire code official*.

Section 503.3 Marking is amended by adding the following sentence at the end of the section:

Signs shall have a 12-inch by 18-inch dimension and shall comply with the Traffic Engineering Services Department of Transportation and Infrastructure Sign Manual as depicted in Figure 503.3

FIGURE 503.3
FIRE LANE SIGNS

Sections 503.4.1 Traffic calming devices is replaced as follows:

503.4.1 Traffic calming devices. Prior to placement, traffic calming devices shall be approved by the *fire code official.* Where *approved*, devices shall comply with City of Englewood Department of Transportation and Infrastructure's Rules and Regulations and specifications including speed cushions and traffic circles

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 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 permitted to require a lesser width.

Section 504.4 Roof hatches is added as follows:

504.4 Roof hatches. All *interior exit stairways and ramps* extending to the uppermost *story* in buildings four or more *stories above grade plane* shall be provided with a roof hatch openable to the exterior. The hatch shall be a minimum of 16 square feet (1.5 m2) in area with a minimum dimension of 2 feet (610 mm).

Exceptions:

1. Pressurized stairway enclosures.
2. Enclosures of *interior exit stairways and ramps* that extend to the roof in accordance with Sections 1011.12 and 1011.12.2 of the *International Building Code* and are provided with a penthouse complying with Section 1510.2 of the *International Building Code*.
3. *Buildings* with all roof slopes exceeding 4 units vertical in 12 units horizontal (33-percent).

Section 504.5 Courts is added as follows:

504.5 Courts. For buildings of Type III, IV, or V construction, access to grade level courts shall be provided from two remote locations. Access points shall be comprised of open-air breezeways not less than 6 feet (1829 mm) wide and not less than the height of the first story of the building. The breezeways shall lie perpendicular and shall have direct view of the court from the frontage location. Where access gates are provided, a key box shall be placed at each entrance. Locations and configurations shall be *approved* also in accordance with Sections 202, 1004.7, 1029 and Section 1205.3 of the *City of Englewood Commercial Building Code*).

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 six inches (153 mm) high with a minimum stroke width of 3/4 inch (19.1 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 graphic site map monument (GSMM) shall be used to identify the structure(s). The GSMM shall be comprised of a monument, pole, sign or other means of identification of the address as *approved* by the *fire code official.* All address identification provided to facilitate emergency response shall be located at ALL entrances into the property.

Commented [MS3]: Suggest we delete

All GSMM's shall comply with the following:

1. Shall maintain the visual clarity of the plastic/polycarbonate cover as scratches, markings, fading and other environmental conditions which deteriorate or reduce the intended legibility.
2. Shall be *approved* by the *fire code official* for location and compliance to the intended function.
3. Shall be located on the premises and out of the Right of Way (ROW).
4. Shall be part of the recurring fire alarm system maintenance, testing, and inspection program.
5. The complex name and address shall be located at the top of the GSMM with a minimum letter height of 1 inch with contrasting backgrounds. The streets shall be identified with minimum letter heights of 1 inch. It is recognized that all lettering and backgrounds may not contrast very well in certain ambient conditions and therefore it shall be the responsibility of the property owner to meet the intent of legibility during an emergency response.
6. Shall be sized so that the building numbers are a minimum of 1 1⁄4 inches in height with contrasting backgrounds. It is recognized that all lettering and backgrounds may not contrast very well in certain conditions and therefore shall be the responsibility of the property owner to meet the intent of legibility during emergency response.
7. Shall include at a minimum: building name; building address, north orientation arrow, "YOU ARE HERE" in contrasting and bold font, adjacent streets & local fire hydrants.

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Exception: Existing dwellings regulated by the *City of Englewood Residential Code*.

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 Section 903.3.1.3.
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 as follows:

507.2.3 Water supply serving high-rise buildings. High-rise buildings as classified by the City of Englewood Commercial Building Code 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. Backflow prevention devices and flow switches shall be provided in accordance with Section 912.6 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 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 Appendix B. Each new or existing fire hydrant as required in accordance with Appendix C, shall be capable of providing not less than 1500 GPM at 20 PSI residual pressure.

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 507.5.5 Clear space around hydrants is replaced as follows:

507.5.5 Clear space around hydrants. A five-foot (1524 mm) clear space shall be maintained around the circumference of fire hydrants, except as otherwise required or *approved*.

SECTION 508
FIRE COMMAND CENTER

Section 508.1 General is replaced as follows:

508.1 Fire command center (FCC). An FCC shall be provided for the following:

1. Where required by Section 907 or 909
2. All high-rise buildings
3. All F-1 and S-1 occupancies with a building footprint greater than 500,000 square feet (46 452 m2)

Section 508.1.05 FCC construction requirements is added as follows:

508.1.-05 FCC construction requirements. 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.
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 Section 707 of the *City of Englewood Commercial Building Code* or a horizontal assembly in accordance with Section 711 of the *City of Englewood Commercial Building Code* 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 Section 907.5.2.2.
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 907.2.13.7
5. Firefighter's smoke control panel in accordance with Section 909.8.
6. Manual controls for simultaneously unlocking stairway and refuge area doors in accordance with Section 1010.1.9.12 of the *City of Englewood Commercial Building Code.*
7. Emergency generator status panel in accordance with Section 907.2.13.8.
8. Telephone with controlled access to a public telephone network.
9. Fire pump remote status panel in accordance with Section 907.2.13.9.
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. 3-foot by 5-foot work table with a chair.

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

14. A key vault *approved* by the Fire Department to house keys to access mechanical and electrical equipment.

15. Two-way communication required by Sections 1009.6.5, 1009.8, 1010.1.9.13.7 Item 3(b), and 3008.6.6 of the *City of Englewood Commercial Building Code* 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.

Section 508.1.8 Heating/cooling zone or system for FCC is added as follows:

508.1.8 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 508.2 Fire command room is added as follows:

508.2 Fire command room. A fire command room shall be provided in the following:

1. In a building with any emergency voice/alarm communication system.

2. In a building where the owner requests that the fire alarm and life safety equipment not be installed in the lobby of the building.

3. In a building where elevator cabs or lobbies must be monitored by surveillance equipment.

The fire command room shall be not less than 48 square feet (4.46 m^2) with a minimum dimension of 8 feet (2.44 m), but not less than that required to accommodate the equipment on one wall. A minimum clear dimension of 6 feet (1.82 m) shall be provided in front of the equipment. The room shall be separated from the remainder of the building by not less than a 1-hour fire barrier constructed in accordance with Section 707 of the *City of Englewood Commercial Building Code*, or horizontal assembly constructed in accordance with Section 711 of the *City of Englewood Commercial Building Code*, or both. The fire command room shall be located in accordance with Section 508.1.1 and shall contain the following equipment, where provided:

1. Fire alarm control unit.

2. Emergency voice/alarm communication equipment.

3. Smoke control panel.

4. Emergency/Standby generator status panel.

5. Fire Pump remote status panel.

6. MNS equipment.

7. Two-way communication required by Sections 1009.6.5, 1009.8, 1010.1.9.13.7 Item 3(b), and 3008.6.6 of the *City of Englewood Commercial Building Code* and two-way communication system required for elevator communication in accordance with ASME A17.1.

8. Elevator surveillance equipment.

The building annunciator shall be located as *approved* by the *fire code official*.

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

SECTION 509
FIRE PROTECTION AND UTILITY EQUIPMENT IDENTIFICATION AND ACCESS

Section 509.3 Location and access to indoor fire pumps is added as follows:

509.3 Location and access to indoor fire pumps. Fire pumps shall be located both at grade level and accessible directly from the outside. Location of the fire pump room is subject to approval by the *fire code official*.

Exceptions:

1. Fire pump rooms may be located one level below grade, provided that the following requirements are met:

   1.1 Maximum total travel distance from exterior access at grade level to the most remote portion of the fire pump room shall not exceed 60 feet.

   1.2 Stairways providing access shall comply with Section 1011 of the *City of Englewood Commercial Building Code* and shall terminate at an exit discharge at grade level. Curved *stairways*, *spiral stairways*, *alternating tread devices*, ship's ladders, and ladders are prohibited.

   1.3 Travel path from the exterior to the fire pump room shall be through a corridor or exit passageway with a minimum fire-resistance rating to match interior exit stairway enclosure rating requirements for the building.

   1.4 No intervening rooms between the *stairway* termination and the fire pump room.

2. In high-rise buildings where the use of fire pumps arranged in series is required due to maximum pressure limitations, the fire pumps supplying the higher zones may be located above *grade* level.

3. In existing buildings where a new fire pump is being added or an existing fire pump is being replaced with a new fire pump of different nominal rating, the location and access shall be preplanned and *approved* by the *fire code official.*

4. Existing fire pumps, including where an existing fire pump and/or controller is being replaced with new equipment of the same nominal rating

Section 510 Emergency Responder Communication Coverage is replaced as follows:

SECTION 510
EMERGENCY RESPONDER RADIO ENHANCEMENT COVERAGE SYSTEM (RES)

510.1 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 Section 405 of the *City of Englewood Commercial Building Code*)

3. Airport buildings and structures

510.1.1 Compliance testing. New buildings of 50,000 gross square feet or more and all new Group E and I occupancies over 10,000 gross square feet sf 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 510.3.1.1 for continued adequacy of emergency responder radio communications coverage. Buildings failing to meet the minimum coverage requirements after testing shall be provided with a 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.

510.1.2 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 510.3.1.1 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.

510.2 Emergency responder radio enhancement system coverage in buildings. Where required by Section510.1, buildings shall have *approved* radio coverage for emergency responders within the building based upon the existing coverage levels of the Department of Safety communication system at the exterior of the building. Systems shall be designed per Section 510 and NFPA 1221. 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 Section 707 of the *City of Englewood Commercial Building Code* or a one-hour fire resistance rated horizontal assembly constructed in accordance with Section 711 of the *City of Englewood Commercial Building Code* 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 it is determined by the *fire code official* that current radio coverage within the building is adequate, written documentation of the compliance of radio coverage shall be maintained on site. See Section 510.3.1 for testing requirements.

510.2.1 Coverage Requirement. The radio system control channel signal level shall exceed -100 dBm at 95 percent or more of the locations measured within each floor plate. Equivalently, the service area reliability shall be 95 percent 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 percent signal coverage of -100dBm or stronger. Inbound and outbound signals shall be sufficient to provide usable voice communications throughout the coverage areas and sufficient to provide not less than a Delivered Audio Quality (DAQ) of 3.0 or an equivalent Signal-to-Interference-Plus-Noise Ratio (SINR) applicable to the technology for either analog or digital signals.

510.3 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 Section 604, UPS minimum battery capacity shall be permitted to be 4 hours.
2. Where a legally required standby generator is installed in accordance with Section 604, and the UPS input circuit is automatically transferred to the generator source, UPS minimum battery capacity shall be permitted to be 4 hours.

510.3.1 Requirements. The system shall 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 approval of the acceptance test as described below. All RES equipment shall be FCC compliant including but not limited to FCC 47 CFR Part 90.219. Equipment shall be listed in accordance with UL 2524.

510.3.1.1 Acceptance test. Test procedures shall comply with FMO Policy 510-1. Measurement locations shall be uniformly distributed to the extent practical. There shall be at least 10 sampling measurements per 4,000 square feet (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, FMO 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.

510.3.1.2 Periodic testing. RES shall be tested annually and at five-year intervals in accordance with FMO Policy 510-1. Additional testing may be required by the department where building modifications have the potential to degrade system performance.

510.3.1.3 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.

510.3.1.4 Permits. A construction permit is required prior to installation, expansion 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 City of Englewood Electrical Signal or Electrical Contractors license and a valid Fire Department issued certificate. An annual City of Englewood 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 FMO licensed contractor performing the work.

510.3.1.5 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*.

510.3.1.6 Shop drawings. Shop drawings, including RF grids, shall be submitted in accordance with Appendix O and *approved* prior to installation of any RES. Drawings shall be a deferred submittal in accordance with Section 133.5 of the Administration of the City of Englewood Building Code. 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.

510.3.1.7 System Monitoring. The RES shall be monitored by a listed fire alarm control unit, or where *approved* by the *fire code official*, shall sound an audible signal at a constantly attended on-site location. Automatic supervisory signals shall include the following:

1. Loss of normal AC power supply.
2. System battery charger failure.
3. Malfunction of the donor antenna(s).
4. Failure of active RF-emitting device(s).
5. Low-battery capacity at 70-percent reduction of operating capacity.
6. Failure of critical system components.
7. The communications link between the fire alarm system and the RES.
8. Oscillation of active RF-emitting device(s).

510.3.1.8 RES antenna density. Systems shall be engineered to minimize the near-far effect and shall include sufficient antenna density to address reduced gain conditions.

Exception: Systems where all portable devices within the same band use active power control features.

510.4 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 Section 714 of the *City of Englewood Commercial Building Code*.

510.4.1 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 Section 707 or 713 of the *City of Englewood Commercial Building Code*. 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 Section 707 of the *City of Englewood Commercial Building Code* or a

one-hour fire-resistance rated horizontal assembly constructed in accordance with Section 711 of the *City of Englewood Commercial Building Code*, or both.

510.4.1.1 RES riser cable in non-high rise buildings. In building construction type of V-A, IV-A, IV-B, IV-C, IV-HT, 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 1-hour fire-resistance rated fire barrier constructed in accordance with Section 707 or 713 of the *City of Englewood Commercial Building Code*. 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 Section 707 of the *City of Englewood Commercial Building Code* or a 1-hour fire-resistance rated horizontal assembly constructed in accordance with Section 711 of the *City of Englewood Commercial Building Code*, or both.

510.5 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.

510.5.1. 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 Department 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.

510.6 Installer certification. No contractor shall install, modify, repair, alter or replace an RES without a valid City of Englewood license. 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.

510.7 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 604
ELEVATOR OPERATION, MAINTENANCE, AND FIRE SERVICE KEYS

Section 604.2 Emergency operation is replaced as follows:

604.2 Emergency operation. New and altered elevators and conveying systems shall comply with Section 920 and Chapter 30 of the *City of Englewood Commercial Building Code*. 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 Chapter 11. All other alterations to existing elevators shall comply with State of Colorado requirements.

Section 604.3 Standby power and all of its subsections are replaced as follows:

604.3 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 Section 1203. Operation of the system shall be in accordance with Sections 604.3.1 through 604.3.4 an illuminated indicator shall be provided in the elevator lobby(ies) at the designated level in accordance with ASME A17.1.

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

604.3.2 One elevator. Where only one elevator is installed, the elevator shall automatically transfer to 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.

604.3.3 Two or more elevators. Where two or more elevators are controlled by a common operating system, all elevators shall automatically transfer to 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 form 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.

604.3.3.1 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 604.3.1.

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

604.3.3.2 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 Section 3007.8 of the *City of Englewood Commercial Building Code*. 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 604.3.1.

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

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

Section 604.4.1 Signage for existing elevators without a visual signal (flashing firefighter hat) is added as follows:

604.4.1 Signage for existing elevators without a flashing hat indicator. Existing elevators with shunt trip capability that do not provide a visual signal (flashing firefighter 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 "Visual Signal."** Sign shall be black lettering on a yellow background.

Section 604.6.2 Exception is replaced as follows:

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

Section 604.6.2.1 is amended by adding items 5 and 6 as follows:

5. Keys shall be Group 3 security in accordance with ASME A17.1 and shall comply with FMO Policy 604.61.

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 604.6.2.1.1 New elevator installations is added as follows:

604.6.2.1.1 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 604.6.2.1.2 Alterations to elevators is added as follows:

604.6.2.1.2 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 604.6.2.1.3 Existing elevator installations is added as follows:

604.6.2.1.3 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.

Section 604.6.2.3 is replaced as follows:

604.6.2.3 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 112.3.2.1.

Section 604.6.2.4 is replaced as follows:

604.6.2.4 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 Section 506.

Section 604.8 Elevator recall for high-rise buildings with pressurized hoistways is added as follows:

604.8 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 hoistways 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 604.9 Fire service access elevators is added as follows:

604.9 Fire service access elevators. Installation of fire service access elevators shall comply with Section 921 and Section 3007 of the *City of Englewood Commercial Building Code*.

Section 604.10 Occupant evacuation elevators is added as follows:

604.10 Occupant evacuation elevators. Installation of occupant evacuation elevators shall comply with Section 921 and Section 3008 of the *City of Englewood Commercial Building Code*.

SECTION 605

FUEL-FIRED APPLIANCES

Section 605.5 Portable unvented heaters is replaced as follows:

605.5 Portable unvented heaters. Portable unvented fuel-fired heating equipment is prohibited within the City of Englewood.

Section 605.8.1 Residential incinerators is replaced as follows:

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

SECTION 608

MECHANICAL REFRIGERATION

Section 608.9.1 Refrigerants other than ammonia is amended by adding the following to the beginning of the section:

608.9.1 Refrigerants other than ammonia. Machinery rooms shall contain refrigerant leak detection and initiate an emergency alarm in accordance with this section and Section 916. The leak detection control unit shall provide a readout displaying the concentration of refrigerant gas detected. Accurate detector calibration shall be demonstrated during acceptance testing. Signage required by Section 916.9 shall state, outside the room **"DO NOT ENTER WHEN LIGHT IS FLASHING – REFRIGERANT LEAK DETECTED"** and inside the room **"FLASHING LIGHT MEANS REFRIGERANT LEAK DETECTED – EVACUATE ROOM AND BUILDING."**

CHAPTER 8
INTERIOR FINISH, DECORATIVE MATERIALS AND FURNISHINGS

SECTION 806
NATURAL DECORATIVE VEGETATION IN NEW AND EXISTING BUILDINGS

Section 806.5 Combustible natural vegetation is added as follows:

806.5 Combustible natural vegetation. Limited quantities of combustible natural vegetation shall be permitted in A, E, I-3, R-1, R-2/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 AND ARTIFICIAL 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 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 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 60 percent of the area of each wall when the building is protected throughout by an automatic fire sprinkler system in accordance with 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 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 18 inches of the exit access door.

Exceptions:

1. Classroom walls may be used to attach artwork and teaching materials not to exceed 80 percent of the area of each wall when the building is protected throughout by an automatic fire sprinkler system in accordance with 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 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 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. Corridor walls may be used to attach artwork and teaching materials not to exceed 60 percent of the area of each wall when the building is protected throughout by an automatic fire sprinkler system in accordance with 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 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 18 inches of the exit access door.

Exceptions:

1. Classroom walls may be used to attach artwork and teaching materials not to exceed 80 percent of the area of each wall when the building is protected throughout by an automatic fire sprinkler system in accordance with 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 Section 701.2.1, 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 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 inches from the wall.

Exception: Where hanging or display of decorative materials is prohibited by Section 701.2.1

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 O.

Section 901.6.3 Records is replaced in its entirety as follows (subordinate Section 901.6.3.1 remains):

901.6.3 Records. Records of all system installations, inspections, tests and maintenance required by this code and referenced standards shall be maintained on the premises. Records shall be completed on National Fire Protection Association 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

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 Group R is amended by adding the exception as follows:

Exception: Group R-X occupancies.

Section 903.2.8.5 Balconies is added as follows:

903.2.8.5 Balconies. Sprinkler protection shall be provided for all balconies and ground floor patios of dwelling units of all construction types. Sidewall sprinklers that are used to protect such areas shall be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members, at a maximum distance of 14 inches (356 mm) below the deck, or as listed by the sprinkler manufacturer.

Exception: Sprinklers are not required for noncombustible balconies where the balcony is not supplied by fuel gas and one of the following is met:

1. The roof or other overhead structure does not cover more than 50 percent of the entire balcony area.
2. The balcony has openings on two or more sides. The area of such openings must be at least 20 percent of the total perimeter wall area of the balcony. The aggregate length of the openings shall constitute a minimum of 40 percent of the perimeter of the balcony.

Section 903.2.8.6 Townhouses is added as follows:

903.2.8.6 Townhouses. When two or more contiguous residential dwelling units constructed as townhouses, including those permitted under the *City of Englewood Residential Code*, are protected by a single, monitored sprinkler system, that system shall be configured so it can be isolated (with valve and tamper switch) and 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: Where a previously *approved* booth is replaced with either an *approved* packaged booth or one constructed in accordance with Section 2404.3.3 and 2404.4.

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

Section 903.2.10.3 Car stackers is added as follows:

903.2.10.2 Car Stackers. Where car stackers and car lift systems with two cars stacked vertically are installed, sprinklers shall be placed between stackers at the deck (ceiling) and shall comply with spacing and obstruction requirements of NFPA 13. Car stackers and car lift systems with more than two cars stacked vertically shall be an engineered, performance-based design approved by the *fire code official*.

Section 903.2.11 Specific building areas and hazards is replaced as follows:

903.2.11 Specific building areas and hazards. In all occupancies other than Group U, an automatic sprinkler system shall be installed for building design or hazards in the locations set forth in Sections 903.2.11.1 through 903.2.11.7.

Section 903.2.11.1.4 Exterior wall openings is added as follows:

903.2.11.1.4 Exterior wall openings. Where exterior wall openings are permitted by Table 705.8 of the *City of Englewood Commercial Building Code* to be up to 50 percent of the exterior wall area openings shall be protected by closely spaced sprinklers, 6 feet on center and located within 6 to12 inches of the wall. The sprinklers shall distribute a minimum of 3 gpm per linear foot of wall opening. The building shall be protected by an automatic sprinkler system complying with the Section 903.3.1.1 or 903.3.1.2. The sprinkler system hydraulic design shall comply with the "Water Curtain" design method in accordance with NFPA 13.

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 Section 403 of the *City of Englewood Commercial Building Code*, 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 amended by adding the following after the last sentence:

All fire sprinkler systems and special extinguishing system designs shall be submitted in accordance with Appendix O.

Section 903.3.1.1.1 Exempt locations is amended by deleting items 3 and 4.

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 Insulation above sprinklers is added as follows:

903.3.3.1 Insulation above fire sprinklers. Flexible non-supporting insulation installed above sprinklers on the underside of floor or roof sheathing shall be secured in place with 20-gauge metal netting with a mesh size not greater than 2 inches by 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 Section 912.6 and the Colorado Cross Connection Manual. Hydraulic calculations shall be based on water supply information provided by City of Englewood Water. 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 percent of the static value or 10 psi, whichever is smaller. Where water supply data is provided by a City of Englewood Water system model, 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 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 system.
2. UL-300 listed fire suppression systems in buildings that are not provided with automatic sprinklers.
3. Medical gas rooms in accordance with Section 5306.

Section 903.3.5.2 Residential combination services is deleted.

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

Section 903.3.9 Elevator hoistways and machine rooms is added as follows:

903.3.9 Elevator hoistways and machine rooms. Sprinklers shall be provided in elevator hoistways and machine rooms only as required by this Section and NFPA 13, in buildings protected with an automatic sprinkler system in accordance with NFPA 13 or NFPA 13R. Hoistways 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.

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 Section 604 and 907.3.3. 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, sprinklers shall be installed per NFPA 13 Section 9.3.6 Installation of automatic sprinklers shall comply with Section 903.3.9.

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 903.3.11 Pre-action sprinkler systems is added as follows:

903.3.11 Pre-action sprinkler systems. Pre-action systems shall be installed in accordance with NFPA 13, this section, and Section 907.6.7. Fire protection piping and initiating device, control and annunciation drawings shall be submitted together, and shall meet the requirements of Appendix O for both fire alarm and automatic sprinkler system submittals. 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 903.3.12 Pressure reducing valves in high-rise buildings is added as follows:

903.3.12 Pressure reducing valves in high-rise buildings. Where pressure reducing valves are utilized in high-rise buildings, each sprinklered level shall be provided with an individual pressure reducing valve.

Exception: Multiple sprinklered levels may be supplied by a pressure reducing valve on a system riser where all the following conditions are met. (see Figure 903.3.12)

1. A method to isolate the pressure reducing valves shall be provided for maintenance & repair.
2. To provide redundancy, pressure reducing valves shall be arranged in series so that failure of any single device does not allow downstream pressure in excess of 10 psi (0.7 bar) below the minimum rated pressure of any component within that portion of the system
3. An equally sized bypass around the pressure reducing valves, with normally closed control valves, shall be installed.

4. The pressure reducing valve(s) arrangement shall be installed not more than 7 feet 6 inches (2.31 m) above the floor.
5. The pressure reducing valves shall be provided with inlet and outlet pressure gauges.
6. The pressure reducing valves shall be provided with a pressure relief valve of not less than 3/4 inch (20 mm) in accordance with the manufacturer's recommendations.
7. Means shall be provided downstream of all pressure reducing valves for flow tests at sprinkler system demand.
8. The system riser does not supply any fire hose connections.

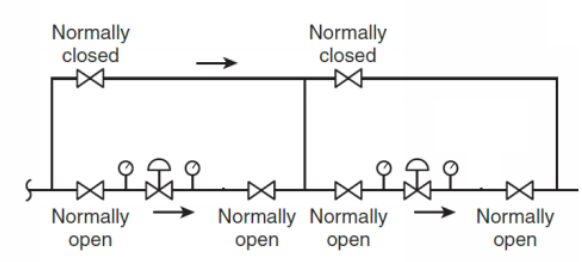

Figure 903.3.12. Example of a PRV arrangement

Section 903.4.2 Alarms is replaced as follows:

903.4.2 Alarms. *Approved* audible/visible devices (24 VDC supervised) shall be provided for every *building* or *structure* with an *automatic sprinkler system*. These sprinkler water flow alarm devices shall be activated in accordance with Section 912.6 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* and *approved* notification scheme.

Exception: One- and two-family dwelling units and townhouses constructed in accordance with the *City of Englewood 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 (floor control valve assembly) for isolation, control, and annunciation shall be provided for each level, including those where sprinklers are supplied by piping on the floor below, of buildings meeting at least one of the following conditions:

1. More than two stories with a total area of all floors, including mezzanines, exceeding the NFPA 13 system protection area limitations or;
2. Required to have standpipes in accordance with Section 905.

Exception: Attic-level sprinklers supplied from the level below are not required to have a separate floor control valve assembly.

SECTION 904
ALTERNATIVE AUTOMATIC FIRE-EXTINGUISHING SYSTEMS

Section 904.3.4.1 Visible notification is added as follows:

904.3.4.1 Visible notification. 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*. Warning signs shall be posted at each entrance door stating: "In the event of a system discharge, DO NOT enter without a self-contained breathing apparatus or until the area is thoroughly ventilated."

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 904.10 Clean-agent systems is replaced as follows (subsections to remain):

904.10 Clean-agent systems. Clean-agent *automatic fire-extinguishing systems* shall be designed and installed in accordance with NFPA 2001, this section, and Section 907.6.7. Clean agent systems are supplemental and not permitted to substitute for required *automatic sprinkler systems* unless specifically approved by the *fire code official*. Shop drawings, calculations, and materials cutsheets for system installations, including initiating device, control and annunciation, shall be submitted in accordance with Appendix O and NFPA 2001. Clean-agent *automatic fire-extinguishing systems* shall be maintained, periodically inspected and tested in accordance with NFPA 2001 and their listing. Records of inspections and testing shall be maintained.

Section 904.13.1 Manual system activation is replaced and Exception 2 is added as follows:

904.13.1 Manual system operation. A manual actuation device shall be located at or near a means of egress from the cooking area not less than 10 feet (3048 mm) and not more than 20 feet (6096 mm) from the kitchen exhaust system or at an *approved* location. The manual actuation device shall be installed not more than 48 inches (1200 mm) nor less than 42 inches (1067 mm) above the floor and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

Exceptions:

Where placement of the manual actuation device 10 feet or more from the exhaust system would place it outside of the cooking area, the device shall be placed at an *approved* location.

Section 904.14 Domestic Cooking Systems item 4 is added as follows:

4. In Group B & R occupancies satisfying the requirements of Policy IMC Section 507.

Section 904.15 Fixed, Mobile, or Temporary Concessions Protections is added as follows:

904.15 Required Installations. Cooking equipment used in fixed, mobile, or temporary concessions, such as trucks, buses, trailers, and structures processes producing smoke or grease-laden vapors shall be equipped with an exhaust system that complies with all the equipment and performance requirements of section 606 and sections 904.15.1 through 904.15.5

Exception: Where fixed structures are governed by the *City of Englewood Mechanical Code*, *City of Englewood Commercial Building Code and City of Englewood Fuel Gas Code*.

904.15.1. Cooking equipment shall be equipped with pre-engineered automatic extinguishing systems tested in accordance with UL 300 and listed and labeled for the intended application. The system shall be installed in accordance with this code, its listing and the manufacturer's instructions.

904.15.2 Manual system operation and interconnection. Manual actuation and system interconnection for the hood suppression system shall be in accordance with Sections 904.13.1 and 904.13.2, respectively.

904.15.3 Portable fire extinguishers. A portable fire extinguisher complying with Section 906.4 shall be installed within a 10-foot travel distance from cooking appliances.

904.15.4 Operations and maintenance. Automatic fire-extinguishing systems protecting commercial cooking systems shall be maintained in accordance with Sections 904.13.5.1 through 904.13.5.3.

904.15.5 Operational permits and Submittals. Pre-engineered, automatic extinguishing system shop drawings shall be submitted for permit application. Electronic submittals shall be made through the online portal. Submittals shall include the following information:

1. UL 300 listing for system.
2. Product data sheets (panel, nozzles, etc.)
3. Nozzle location shown with type of appliance.
4. Discharge density for the cooking equipment being protected.
5. Location of manual pull station from hood.

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 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 such tools shall be provided at locations *approved* by the Fire Department.

Section 905.2.1 Maximum pressure is added as follows:

905.2.1 Maximum pressure. The maximum pressure at any point in the standpipe system at any time shall not exceed 350 psi

Section 905.3.1 Height is replaced as follows:

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

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

Section 905.3.4.1 Hose and cabinet is deleted.

Section 905.3.8. Landscaped roofs is replaced as follows:

905.3.8. Landscaped roofs. Buildings or structures that have landscaped roofs and that are equipped with a standpipe system shall have the standpipe system extended to the roof level on which the landscaped roof is located. The standpipe hose outlet shall be located within 230 feet of all vegetated areas and located within the access point.

Exception. In existing buildings, the *fire code official* may approve a standpipe hose outlet in an alternate location when the building provides an *approved* alternative method for firefighters or emergency responders to accomplish suppression efforts.

Section 905.4 Location of Class I standpipe hose connections is amended by replacing Items 1, 2 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*.

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

   Exception: Where all floor areas are reachable from an *interior exit stairway* hose connection on the same side of a horizontal exit within 200 feet for sprinklered buildings or 130 feet for non-sprinklered buildings, the hose connection on the other side of the horizontal *exit* shall not be required.

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 percent) slope, there shall be at least two 2-1/2-inch roof manifold outlet connections above the roof line. Roof manifolds shall be located on the exterior perimeter of the stair enclosure within 20 feet of the roof access opening door.

Section 905.4.1 Protection is amended by adding exception 2 as follows:

Exceptions:

2. Where additional standpipes are needed to meet travel distance requirements in non-high-rise buildings, protection of piping is not required in buildings equipped with an *approved* automatic sprinkler system.

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

Section 905.8 Dry standpipes is replaced as follows:

905.8 Dry standpipes. Dry standpipes shall not be installed.

Exceptions:

1. Where subject to freezing and in accordance with NFPA 14.
2. Class I automatic dry standpipes shall be permitted in mixed-use open parking garages where the highest floor is located not more than 75 feet above the lowest level of fire department vehicle access. The standpipe system serving the open parking garage shall be integrated with the fire protection system serving the other occupancies and shall not be a stand-alone system.
3. Class I automatic dry standpipes shall be permitted in single-use open parking garages where the highest floor is located not more than 75 feet above the lowest level of fire department vehicle access.
4. Class I manual dry standpipes shall be permitted in single-use open parking garages where the highest floor is less than 55 feet from the lowest level of fire department vehicle access. This provision is applicable to open parking garages with one level of underground enclosed parking garage.

Section 905.13 Combined systems is added as follows:

905.13 Combined systems. Working pressure and NFPA 13 pressure reducing valve requirements for combined sprinkler and standpipe systems shall include and be based on the manual standpipe system demand pressure provided at the most remote fire department connection.

SECTION 906
PORTABLE FIRE EXTINGUISHERS

Section 906.1 Where required Item 1, Exception 1 is replaced as follows:

> **Exception 1**. In Group R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 2-A:10-B:C.

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

7. **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.

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 in accordance with Section 133.4 of the *City of Englewood Commercial Building Code*. 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 O.

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 Department. Keys for all equipment required to be accessible to the Fire Department shall be maintained in an *approved* location in accordance with 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 Section 1010.1.9 of the *City of Englewood Commercial Building Code*, elevator recall and shunt trip in accordance with Section 907, 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 feet (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 square feet. 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 918. 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 Department. Under no circumstances shall a FMO radio box be removed from a protected premise without written approval of the *fire code official*.

Campus arrangements or a complex of buildings requiring a graphic site map monument per Section 505.1 shall have each building's address transmitted to the central station.

With the exception of FMO radio boxes, point or contact ID transmittance is required for fire alarm control units. Central Station operators shall provide FMO Dispatch the specific point(s) that have been reported.

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 *fire code official.*

Section 907.1.8 Problematic systems is added as follows:

907.1.8 Problematic systems. Fire alarm systems that generate two or more false or nuisance fire alarms within 24 hours, three or more within 30 days, or ten or more within one year shall be immediately repaired, mitigated or replaced as necessary. A fine will be imposed for any false or nuisance fire alarms exceeding ten 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 or more times within a 12-month period, legal action will 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 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 detectored spaces 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 any allowed penalties.

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

907.2.1.3 Illumination of means of egress. Where the means of egress illumination is reduced at walking surfaces in auditoriums, theaters, concert or opera halls, and similar occupancies in accordance with Section 1008.2.1 of the *City of Englewood Commercial Building Code*, the required illumination shall be automatically restored upon activation of a premises' fire alarm system.

Section 907.2.1.4 Smoke control is added as follows:

907.2.1.4 Smoke control. Where required by Section 1030.6.2 of the *City of Englewood Commercial Building Code* 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 square feet. (2090.31 m2) or serve more than one smoke control zone. Where ceiling heights are 30 feet (9144 mm) 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 communication system shall be provided in accordance with Section 907.5.2.2.

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 deleted.

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 Section 907.5.2.2.

Exceptions:

1. Where the Group E area increase is less than 20 percent 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 Section 907.5.2.2 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 Office approval is required for pre-signal application or alarm verification.
4. Automatic fire detectors are not required in sprinklered areas less than 24 square feet (2.23 m2.).

Section 907.2.6.2 Group I-2 is replaced as follows:

907.2.6.2 Group 1-2. An automatic smoke detection system shall be installed in corridors in Group I-2 Condition 1 facilities and spaces permitted to be open to the corridors by Section 407.2 of the *City of Englewood Commercial Building Code*. Corridors and areas open to corridors in Group I-2 occupancies shall be provided with automatic smoke detection. Additionally, Group I-2 occupancies shall be provided with smoke detection as required in Section 407.2 of the *City of Englewood Commercial Building Code* where not in conflict with this section.

Exceptions 1 and 2 to remain.

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 Section 907.5. Conversion of existing buildings to small day care centers in accordance with 308.5 of the *City of Englewood Commercial Building Code* 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 waterflow 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 Sections 907.2.11.1 through 907.2.11.6, 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 licensed 3rd party firm 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 *City of Englewood 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 shall be provided with a fire command center in accordance with Section 508, manual fire alarm boxes located in accordance with Section 907.4.2 and automatic fire alarm and detection system in accordance with Section 907.2.12.1, a fire department communication system in accordance with Section 907.2.12.2, and an emergency voice/alarm communication system in accordance with Section 907.5.2.2 that provides occupant notification of alarm on the fire floor, floor above, floor below and at the level of the FCC.

Exceptions 1-6 to remain.

Section 907.2.13.1.1 Area 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 hoistways (automatic fire 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 Section 712 of the *City of Englewood Commercial Building Code*, 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 712.1.3 of the *City of Englewood Commercial Building Code*. Two-story openings in other than I-2 and I-3 occupancies shall comply with Section 712.1.9 of the *City of Englewood Commercial Building Code*. 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 510.2.1

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 *Electrical Code of the City of Englewood* and shall comply with the pathway survivability requirements of NFPA 72, 24.3.14.

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 FCC. Permanently mounted telephone handsets shall be provided in the locations listed below:

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

Section 907.2.13.4 Alarm notification is added as follows:

907.2.13.4 Alarm notification. Alarm notification in high-rise buildings shall comply with Section 907.5, 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 FCC. This function shall be accomplished by an *approved* switch located in the FCC.

Section 907.2.13.5 Smoke control system activation and its subsections are added as follows:

907.2.13.5 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 907.2.13.5.1 and 907.2.13.5.2. After the initial alarm activation, any subsequent automatic alarm activation on another floor shall initiate the floor exhaust sequence in accordance with Section 907.2.13.5.2.

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.

907.2.13.5.1 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 907.2.13.5 above.

Exception: On vegetated roofs, activation of rooftop manual pull stations shall not activate building vertical pressurization systems.

907.2.13.5.2 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 907.2.13.6 Annunciation is added as follows:

907.2.13.6 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 907.2.13.7 Elevator status/control panel and its subsection are added as follows:

907.2.13.7 Elevator status/control panel. An elevator status/control panel shall be provided. The elevator status/control panel shall comply with FMO policy 907.2.13.7 and:

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. Indicate whether the elevators are operational.
6. Indicate direction of travel.
7. Have key switches as required for selective activation of cars if all are not capable of simultaneous operation on secondary power.
8. Phase I Fire Service Recall Key switches in accordance with ASME A17.1.
9. Two-way communication system from the elevator to the FCC shall be incorporated on the elevator status panel. Two-way communication systems shall meet ASME A17.1.
10. Indicate whether the hoistway doors are open or closed.
11. Visual signal (flashing firefighter hat) for each elevator that has a corresponding in-car visual signal (flashing firefighter hat).

No other elevator functions shall be installed on these panels without approval from the *fire code official*.

Section 907.2.13.7.1 Fire service elevator status panels is added as follows:

907.2.13.7.1 Fire service elevator status panels. Status of designated fire service elevators shall be displayed on an *approved* standard emergency services interface in accordance with Section 920.9. These indications shall be combined with the requirements of Section 907.2.13.7.

Section 907.2.13.8 Emergency generator status panel is added as follows:

907.2.13.8 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 907.2.13.9 Fire pump status panel is added as follows:

907.2.13.9 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.

Section 907.2.14 Atriums connecting more than two stories is replaced as follows:

907.2.14 Atriums connecting more than two stories. A smoke detection and smoke exhaust system shall be provided in atriums that connect more than two stories. The smoke exhaust system shall be designed in accordance with Section 909.14.

907.2.14.1 Activation. Activation of two smoke detectors in the atrium shall initiate the atrium exhaust sequence. In high-rise buildings, activation of a smoke detector located in areas separated from the atrium by a smoke barrier shall operate in accordance with Section 907.2.13.4.

907.2.14.2 Detection. Detection shall be as follows:

1. Area type smoke detectors, spaced in accordance with NFPA 72, shall be installed at the atrium ceiling where the ceiling is 30 feet (9.144 m) or less from the floor of the atrium. If the ceiling is greater than 30 feet (9.144 m) from the atrium floor, beam type detectors shall be installed. A detection system with alarm verification may be installed. The initial device in alarm shall initiate a supervisory condition at the fire alarm panel.
2. On the underside of projections into the atrium, spaced in accordance with NFPA 72.
3. Around the perimeter of the atrium opening on all floors open to the atrium. The detectors shall be spaced not more than 30 feet (9.144 m) on center and shall be located within 15 feet (4.572 m) of the atrium opening.
4. In high-rise buildings, where any part of the floor is open to an atrium, smoke detectors shall be located throughout the floor not included in the atrium area for every 2500 square feet (232.258 square meters) of occupied floor space. No smoke detector shall serve more than one smoke zone.
5. All smoke detectors shall be accessible for maintenance and testing.

Sections 907.2.20 Smoke detection in covered malls is added as follows:

907.2.20 Smoke detection in covered malls. Where covered malls require a smoke control system in accordance with Section 402.7.2 of the *International Building Code*, smoke detection shall be provided in accordance with Section 907.2.143.1.2.

Section 907.2.24 Airport buildings and structures is added as follows:

907.2.24 Airport buildings and structures. See NFPA 415, as amended in accordance with Appendix S of the *City of Englewood Commercial Building Code*.

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 907.4.3.2.

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 this section, ASME A17.1, and NFPA 72**.** Fixed temperature 190-to-200-degree F heat detection and smoke detectors shall be provided for shunt trip and recall operation, respectively, where those functions are required. Fixed-temperature, 135-degree F heat detection shall be installed at the top of elevator hoistways for recall operation where shunt trip is not required and where elevator machinery is installed in a non-sprinklered hoistway. Smoke detectors shall be installed in all machine rooms, control rooms and machine and control spaces. Where environmental or other conditions prohibit installation of smoke detectors for recall, fixed-temperature, 135-degree F heat detectors shall be permitted to substitute for the required recall smoke detectors. Detectors shall be connected to the building fire alarm system, where provided.

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, identifying the alternative means and methods that will be provided.
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. Building plans shall be permanently mounted adjacent to the panel in accordance with Section 907.6.4.1.1.1
3. Where linear heat detection is installed, 155-degree F detection shall be permitted for recall operation.

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 Shunt trip is added as follows:

907.3.3.2 Shunt trip. Where sprinklers are provided in elevator shafts and machine rooms, machinery spaces, or control rooms or spaces, elevator power shunt trip shall be activated prior to sprinkler operation in accordance with NFPA 72. Shunt trip is not required for sprinklers installed within 2 feet (610 mm) of the floor of the elevator pit.

Section 907.3.3.3 Shunt trip circuit breakers is added as follows:

907.3.3.3 Shunt trip circuit breakers. 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 hoistways and machine/control rooms/spaces is added as follows:

907.3.3.4 System smoke detectors shall be located in elevator lobbies, sprinklered hoistways 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 FCC. Use of detector relay bases for recall activation is specifically prohibited.

Exception: Upon recall, elevators in pressurized hoistways 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 is deleted as a reference. Operation of the elevator visual signal (flashing firefighter hat) 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 visual signal (flashing firefighter hat) 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 visual signal (flashing firefighter hat) shall illuminate intermittently (flashing).

Section 907.3.3.5.2 Alterations to existing elevators and subsections are 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 visual signal (flashing firefighter hat) 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. In cars not equipped with an elevator visual signal, signage shall be provided in accordance with Section 604.3.1. Protection of elevator lobbies, hoistway and machine room shall be provided per Section 907.3.3.5.2.1 or 907.3.3.5.2.2.

907.3.3.5.2.1 Hydraulic elevator. Detection 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. Where sprinklers are installed in the hoistway, a fixed-temperature, 190-to-200-degree F heat detection shall be installed within 2 feet (610 mm), and at the same elevation, of each sprinkler. Activation of such heat detection, or of a smoke detector in the machine room, shall cause the elevator visual signal, where provided, to flash and shall initiate the required recall prior to operation of the sprinkler.
3. 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 elevator visual signal, where provided, to flash.

907.3.3.5.2.1 Traction elevators. Detection 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. For elevators provided with an elevator visual signal, fixed-temperature, 135-degree F heat detection shall be installed at the top of the hoistway to provide recall and cause the elevator visual signal in the car to flash.

   Exception: Where linear heat detection is installed, 155-degree F detection shall be permitted for recall operation.
3. 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 elevator visual signal, where provided, to flash.

Section 907.4 Initiating devices is amended by adding Exception 1

1. Occupant notification shall not activate upon operation of detectors at the top of stairwells or in elevator hoistways or main or service chute water flow devices.

Section 907.4.3.2 Remote indicating lights is added as follows:

907.4.3.2 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 an exception as follows:

In highrise buildings, occupant notification shall not activate upon operation of detectors at the top of stairwells or in elevator hoistways 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 Sections 907.5.2.1, 907.5.2.2 and 907.5.2.3, and as required by other sections of this code. Notification appliances shall be listed for the purpose.

Exception: The silencing switch is not permitted in healthcare facilities regulated by the Colorado Division of Fire Prevention & Control (DFPC) on behalf of the Center for Medicaid Services (CMS).

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 Sections 907.5.2.1.1 through 907.5.2.1.3

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, 18.4.6.3 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 theaters, nightclubs, dance halls, ballrooms and similar areas, means shall be provided to reduce or eliminate background noise upon activation of the emergency voice/alarm communication system.

Section 907.5.2.2.8 Communication system location is added as follows:

907.5.2.2.8 Communication system location. All buildings provided with an emergency voice/alarm communications system shall have the communication systems and other life safety equipment located in a fire command room constructed in accordance with Section 508.2.

Section 907.5.2.3.2 Groups I-1 and R-1 is replaced as follows:

907.5.2.3.2 Visible notification appliances in Groups R-1 and I-1 occupancies. Group R-1 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 Table 907.5.2.3.2. All accessible units required by Table 1108.6.1.1 of the *International Building Code*. shall be provided with visible notification appliances as part of this requirement.

Section 907.5.2.3.3.1 Wired equipment is deleted.

Section 907.5.2.3.4 Visible notification appliances in R-3 and R-4 occupancies is added as follows:

907.5.2.3.4 Visible notification appliances in R-3 and R-4 occupancies. Sleeping rooms shall be provided with visible notification activated by an integral in-room smoke alarm. Visible notification appliances shall also be provided which shall be activated by the building fire alarm and/or sprinkler system, where provided.

Exception: Buildings that do not contain more than two dwelling units.

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 areas of rescue assistance as required by Section 1009.8 of the *City of Englewood Commercial Building Code*.
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 in buildings with 2-hour *fire-resistance rated* floors, the systems wiring shall be designed to meet Pathway Survivability Level 3 in accordance with NFPA 72. Where survivability is required in *buildings* with 1-hour *fire-resistance rated* floors, pathway survivability shall comply with NFPA 72.

Exception: Stacked closets dedicated for fire alarm and other approved emergency equipment 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.

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 one-half of 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 one-half of 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 one-half of 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 907.6.4 Zones is replaced as follows:

907.6.4 Zones. All *fire alarm systems* shall be divided into alarm zones. Each floor shall be zoned separately, nad a zone shall not exceed 22,500 square feet (2,090 square meters). The length of any zone shall not exceed 300 feet (91.4 m) in any direction. 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. Each fire sprinkler water flow zone.

Separate visible indication shall be provided for:

1. Main fire sprinkler flow. Individual risers in accordance with 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 (Except for duct detectors required for activation of smoke control systems' activation as required by Section 907.2.13.5 which shall be supervisory alarms). 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 Zoning indicator panel and subsections are 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 waterflow 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 O.

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 O, 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.

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 70 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 and subsections are 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.

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.

907.6.7.2 Control panels for pre-action systems. 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.

907.6.7.3 Cross-zoned detection. Cross-zoned detection systems shall transmit a building alarm on activation of the first initiating device. Double-interlock pre-action systems shall not have cross-zoned detection.

907.6.7.4 Pre-action system submittals. Fire protection piping and initiating device, control and annunciation drawings, calculations, and material cutsheets shall be submitted in accordance with Appendix O for both *fire alarm system* and *automatic sprinkler system* submittals, per 903.3.11.

907.6.7.5 Clean-agent automatic fire-extinguishing system submittals. Fire protection piping and initiating device, control and annunciation drawings, calculations, and material cutsheets shall be submitted in accordance with Appendix O and NFPA 2001, per Section 904.10

Section 907.11 Non-required full or partial systems is added as follows

907.11 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 *City of Englewood Residential Code.*

Section 907.11.1 General system design and installation requirements is added as follows:

907.11.1 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 907.11.2 Design criteria is added as follows:

907.11.2 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.
5. Multiple non-required, non-monitored systems in a building are not required to be interconnected.

SECTION 908
EMERGENCY ALARM SYSTEMS

Section 908.3 Fire alarm system interface is replaced as follows:

908.3 Emergency Fuel Shut Off (EFSO) for Aircraft Fueling. Emergency alarms for notification of an emergency condition involving aircraft fueling shall be provided as required in Section 2006.6.

Section 908.4 Emergency alarm systems is added as follows:

908.4 Emergency alarm systems. Manual emergency alarm systems 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 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 Sections 908.1 through 908.3 unless otherwise *approved* by the *fire code official*.

Emergency alarm systems shall be monitored by the building fire or sprinkler alarm control panel unless otherwise *approved* by the *fire code official*. An emergency alarm system shall be annunciated as a separate zone on the building annunciator and transmitted to the central station as a separate/distinct signal and be relayed to FMO Dispatch as such. Where the fire or sprinkler alarm control panel is not monitored by a supervising station, annunciation shall be provided in an *approved* location. Floor plans of the area protected by an emergency alarm system shall be provided as part of the building graphic maps.

Audible and visible emergency alarm notification appliances shall be installed on the interior and exterior of the areas identified in Sections 908.1 through 908.3 per the notification requirements of NFPA 72. Audible 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 inside or 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 one-half-inch stroke unless otherwise *approved* by the *fire code official*. 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 908.4.1 Emergency alarm systems shop drawings is added as follows:

908.4.1 Emergency alarm systems shop drawings. Shop drawings for emergency alarm systems shall be submitted for permit application as a deferred submittal in accordance with Section 133.5 of the *City of Englewood Commercial Building Code*. 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 O.

Section 909 Smoke Control Systems is replaced in its entirety as follows:

SECTION 909

SMOKE CONTROL SYSTEMS

909.1 Scope and purpose. This section applies to mechanical smoke control systems when they are required by other provisions of this code. The purpose of this section is to establish minimum requirements for the design, installation and acceptance testing of smoke control systems that are intended to provide a tenable environment for the evacuation or relocation of occupants. Smoke control systems regulated by this section serve a different purpose than the smoke- and heat-venting provisions found in Section 910. Mechanical smoke control systems shall not be considered exhaust systems under Chapter 5 of the *City of Englewood Mechanical Code*.

Exceptions:

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.

909.2 General design requirements. Buildings, structures or parts thereof required by this code to have a smoke control system or systems shall have such systems designed in accordance with the applicable requirements of Section 909 and the generally accepted and well-established principles of engineering relevant to the design. The construction documents shall include sufficient information and detail to adequately describe the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied by sufficient information and analysis to demonstrate compliance with these provisions.

909.3 Smoke control systems. As required by other sections of this code, smoke control system(s) shall be provided for high-rise buildings, atriums, covered malls, underground buildings, assembly occupancies with smoke-protected seating, stages and areas in accordance with Section 410 of the *City of Englewood Commercial Building Code*, airport buildings in accordance with Appendix S of the *City of Englewood Commercial Building Code*, and assembly occupancies with an aggregate of 1,000 or more occupants in high-rise buildings. This requirement shall be applicable to the Occupancy Groups as follows: A; B; E; M; R-1; R-2, and I-1 and I-3.

909.3.1 Unenclosed vertical openings. Where unenclosed vertical openings are provided as permitted by Section 712 of the *City of Englewood Commercial Building Code*, buildings with a smoke control system shall have the floor openings between smoke zones protected by draft curtains and closely spaced sprinklers installed in accordance with NFPA 13 smoke detectors located at the floor side of the opening.

909.4 Construction document submittals. Construction documents for smoke control systems shall be submitted for permit application with the construction drawings for the project in accordance with Section 133.of the *International Building Code*, including the seal and signature of the design professional responsible for the coordination of the smoke control design package

909.5 Shop drawing submittals (deferred submittal). The deferred submittal shall be consistent with the *approved* construction document submittal and reviewed by the engineer of record prior to submission to the Englewood Fire Marshal's Office in accordance with Appendix O.

909.6 Smoke barrier construction. Smoke barriers shall comply with Section 709 of the *City of Englewood Commercial Building Code*.

909.7 Power systems. The smoke control system shall be supplied with two sources of power. Primary power shall be from the normal building power system. Secondary power shall be from an *approved* emergency or standby source complying with NFPA 70 (NEC). The secondary power source and its transfer switches shall be in a separate room from the normal power transformers and switchgear and shall be enclosed in a room

constructed of not less than 1-hour fire barriers ventilated directly to and from the exterior. Power distribution to the automatic transfer switch from the two sources shall be by independent routes. Transfer to secondary power shall be automatic and in compliance with NFPA 70 (NEC).

909.7.1 Power sources and power surges. Elements of the smoke control system relying on volatile memories or the like shall be supplied with uninterruptible power sources of sufficient duration to span a 15-minute primary power interruption. Elements of the smoke control system susceptible to power surges shall be suitably protected by conditioners, suppressors or other *approved* means.

909.7.2 Wiring. In addition to meeting requirements of NFPA 70 (NEC), all wiring, regardless of voltage, shall be fully enclosed within continuous raceways in mechanical rooms, electrical rooms, elevator equipment rooms and vertical risers. Wiring shall not be painted. The detection and control system wiring shall be clearly marked at all junctions, accesses and terminations.

909.8 Firefighter's smoke control panel. A firefighter's smoke control panel meeting the requirements of UL 864 and listed for smoke control under UL product category guide designation UUKL shall be provided and shall include manual control or override of automatic control for mechanical smoke control systems. Upon an alarm, the fire alarm system shall take direct control of all smoke control system components such as fans, dampers, activation of dedicated pressure control systems and status indication. The fire alarm system shall provide a signal to any temperature control or building automation systems for HVAC system enable/disable control and status. Where HVAC systems are utilized for smoke control the fire alarm system shall take direct control of those HVAC system components utilized for smoke control. Hard-wired interlock is acceptable. The fire alarm system shall provide automatic and manual override control and status. Terminal air distribution units may remain under their own normal building automation control. The panel shall be located in a fire command center complying with Section 509 in high rise buildings or buildings with smoke-protected assembly seating. In all other buildings, the firefighter's smoke control panel shall be installed in an *approved* location adjacent to the fire alarm control panel. The firefighter's smoke control panel shall comply with Appendix O.

909.8.1 Smoke control systems. The firefighter's control panel shall be provided for manual or override of automatic control of mechanical smoke control systems. This panel shall graphically depict the individual smoke control system fan and damper controls, their relative location within the building, stairwells, hoistways, building pressurization and exhaust airflow, refuge area pressurization and all other smoke control zones that apply. This panel shall clearly show the building arrangement and smoke control zones served by the systems. The graphic panel shall be oriented to the building and include a North reference compass point. A combination of vertical (section) and/or horizontal (plan) graphic arrangement may be necessary. The operating control and status indicators on the FSCP shall have a maximum height from the floor of 6 feet, 6 inches and a minimum of 2 feet, 0 inches, and may require more than one section to accommodate height limitations. Layout, labeling and location of the fire fighters control panel shall be reviewed and *approved* by the Fire Department prior to fabrication.

909.8.2. Verification. Control systems for mechanical smoke control systems shall include provisions for verification. Verification shall include positive confirmation of actuation, testing, manual override, and the presence of power downstream of all disconnects. A preprogrammed weekly test sequence shall report abnormal conditions audibly, visually, and by printed report. The preprogrammed weekly test shall operate all devices, equipment, and components used for smoke control. Monitoring for fault status for pressurization and smoke removal fans shall include the following:

1. Loss of power to the fan or VFD/motor starter.
2. Open electrical disconnect at pressurization and smoke removal fan, whether the *fire alarm system* is in alarm or not.
3. Fan fails to move air by program or switch on FSCP.

4. VFD/motor start failure.

909.9 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

909.10 Testing of smoke control systems. Before the Fire Department accepts the smoke control systems and prior to initial occupancy, the smoke control systems shall be tested in their presence to confirm that the systems operate in compliance with this Section. In addition, all smoke control systems shall be tested annually and shall be maintained to perform its intended purpose under the code version with which it was built.

909.10.1 Acceptance testing. The requirements of acceptance testing defined hereinafter shall be the minimum requirements. All acceptance tests shall be witnessed by a Fire Department representative.

1. Furnish a testing procedure, reviewed by the smoke control system design professional engineer, to the Fire Department 72 hours in advance of the acceptance tests being performed. The procedure shall define how compliance with the code will be demonstrated. The procedure shall also identify what instrumentation including artificial smoke generating equipment, will be used during the testing.
2. Smoke control systems testing shall include the following subsystems to the extent that they affect the operation of the smoke-control system:
    a. Fire alarm system (See NFPA 72)
    b. Building automation and temperature control system
    c. HVAC equipment
    d. Electrical equipment
    e. Power sources including emergency or standby power
    f. Automatic suppression systems
    g. Automatic operating doors and closers
    h. Dedicated and non-dedicated smoke-control systems
    i. Emergency elevator operation
3. Prior to witnessed acceptance testing of the smoke control systems, the design professional engineer shall confirm and advise the Fire Department in writing that the entire smoke control system has been installed, air balanced and tested in accordance with its design, plans, specifications and this code.
4. The following shall be notified so that they may witness the acceptance testing:
    a. Design professional Engineer-of-Record
    b. Building contractor
    c. Owner’s representative
    d. Fire Marshal’s Office

e. City of Englewood Building Department

5. Unless otherwise *approved* by the Fire Department, sufficient smoke shall be generated to produce at least the volume of the smoke zone being tested within approximately five minutes. All smoke-generating devices shall be supplied by the owner or his representative and *approved* by the *fire code official*.

6. Acceptance testing shall demonstrate that the correct outputs are produced for a given input for each control sequence specified. The following control sequences shall demonstrate complete smoke-control sequence.

   a. Normal mode

   b. Automatic smoke-control mode for first alarm

   c. Manual override of normal and automatic smoke-control modes

   d. Return to normal

7. After the smoke control system is activated, smoke shall not continue to migrate to other smoke zones of the building.

8. Smoke control systems shall demonstrate the ability to inhibit smoke from migrating across smoke zone boundaries to other areas and containment within the active smoke zone. Smoke control systems shall also demonstrate the continual reduction of smoke concentration from within the active smoke zone by demonstrating exhaust rates of at least 40 percent during incident (sealed floor except one stairway door in open position) and at least 80 percent of the design rate in post fire conditions for salvage and overhaul operations. These system capabilities shall be measured and verified with anemometers or similar measurement tools during acceptance testing at the exhaust intake locations.

   909.10.1.1 Testing requirements. Tests shall be performed in full automatic mode with the building operating under both normal power and emergency power. Test equipment shall include manometer (calibrated within last 12 months), spring scale and other equipment as necessary to adequately measure and record system performance. Communications shall be provided between the test locations and the fire command center.

   1. For a building that is not a high rise, multiple tests on more than one floor or smoke zone shall be required to demonstrate proper operation.

   2. For high rise buildings, tests shall be conducted at a minimum of three locations.

      a. A floor in the lower third, a floor in the middle third and a floor in the upper third of the building.

      b. With a floor in alarm, an additional automatic alarm shall be initiated on a floor immediately above or below the initial floor in alarm. All floors in alarm shall go to exhaust mode

      c. With a floor in alarm, a manual pull station on another floor shall be activated. Smoke control operation shall not be affected.

      d. For atriums, more than one test may be required depending upon the atrium configuration, its relationship to adjacent spaces and if the atrium is located in a high-rise.

      e. Activation of one smoke detector in each smoke control zone on each floor being tested.

      f. Activation of at least one sprinkler flow switch.

g. Activation of at least one manual pull station.

3. For high rise buildings, pressure differentials shall be measured across stairway doors, across elevator/lobby/refuge corridor area doors and adjoining spaces, between atriums and areas immediately adjacent to atriums where atriums are part of a high-rise building. Door opening force into stair enclosures or refuge areas shall not exceed 30 pounds under any conditions.

4. Upon activation of the fire alarm system for each test, confirm that the smoke control system fans and dampers have assumed the correct operating condition for the type of alarm initiating device and the location of the initiating device. This shall be confirmed also at the smoke control panel in the fire command center.

5. Manually override the operation of a sampling of fans and dampers during each test, taking care not to damage system components. Return all override switches to their "auto" position after each test.

6. Make-up air provisions may include:

   a. Stairway doors on the fire floor may be opened and used as a source of make-up air during smoke exhaust system testing.

   b. Variable frequency drives for smoke exhaust system fans may be controlled in response to duct static pressure settings.

   c. Dedicated make-up air systems.

   d. Other methods as documented in the design submittals and *approved* by the *fire code official*.

909.10.3 Annual tests. Annual tests shall be performed in accordance with Sections 909.10.3.1 and 909.10.3.2, on all smoke control systems including those installed prior to adoption of this code. It is recognized that smoke control systems installed prior to adoption of this code could have parameters that are different than those described in this section. In those cases, smoke control tests shall be adjusted accordingly to meet the intent of this section.

The *fire code official* or their representatives shall have the authority to witness any regularly scheduled annual testing of smoke control systems.

909.10.3.1 Equipment operating tests. The following equipment operating tests shall be conducted annually on the smoke control system components:

1. Verify the proper control and status indication of smoke control dampers (i.e., "OPEN/CLOSED") and fans (i.e., "ON/OFF") by visual observation at each damper and fan location and at the smoke control status/control panel in the fire command center.

2. Verify that all smoke control dampers and fans assume the correct operating position under both normal and fire modes and when the manual override switches at the smoke control status/control panel are placed in the "auto" position.

3. Verify that the manual override switches function properly for smoke control dampers and fans.

4. Items l, 2 and 3 above may be performed by qualified service technicians who are familiar with the proper operation of the smoke control systems and equipment. The engineer responsible for conducting the smoke control system performance tests shall develop the test procedures to be used and review the results obtained by the service technicians, including an actual sampling to confirm the accuracy of the test. A statement summarizing this review shall be included in the performance

test report described in Section 909.10.4 that is required to be submitted by the engineer to the Fire Department.

5. A copy of the written test procedure and an accurate log of tests shall be maintained in the fire command center and at either the building management office or the maintenance office. A copy of the previous test report shall be submitted to the engineer responsible for the smoke control performance tests for the engineer's review and approval prior to the smoke control test. Any defects, system modifications and repairs shall be recorded in the log. Necessary corrections shall be made prior to the smoke control performance test.

909.10.3.2 Performance tests. Within 30 days after completion of annual equipment operating tests defined above, conduct the following smoke control system performance tests. The annual smoke control systems tests shall be conducted under the direct supervision of a professional engineer qualified in the testing of such smoke control systems.

1. Activate the smoke control systems automatically through the fire alarm system for tests used to confirm proper sequencing of the system components. Measure actual relative pressure differentials between areas in alarm and adjacent areas and actual door opening forces.

2. For high rise buildings, conduct smoke control tests, observations and measurements of all aspects of the smoke control system at a minimum of 15 percent of the smoke-controlled floors with a minimum of 3 floors, evenly spaced throughout the vertical sections of the building. Smoke control tests in subsequent years shall be conducted on previously untested floors, as may be practical so that all floors ultimately are tested.

3. For all other buildings, conduct smoke control tests, observations and measurements of all aspects of the smoke control system at a minimum number of locations to demonstrate proper performance as *approved* by the Fire Department. Each test shall attempt to involve as many different fan systems as practical. Smoke control tests in subsequent years shall be conducted on previously untested locations, as may be practical so that all locations ultimately are tested over a three-year period.

4. Tests of the smoke control system shall be conducted by activation of at least one smoke detector in each smoke control zone on each floor being tested. One test of at least one of the smoke control zones shall include activation of one sprinkler flow switch. In addition, the smoke control tests shall include activation of at least one manual fire alarm box. For high rise buildings, pressure differentials shall be measured across stairway doors, between floors in alarm and floors immediately above and below floors in alarm, across elevator/lobby/refuge corridor area doors and adjoining spaces in Group R-1, R-2 or I-1 occupancies, and between atriums and areas immediately adjacent to atriums where atriums are part of high rise buildings.

5. Upon activation of the fire alarm system for each test, confirm that the smoke control system fans and dampers have assumed the correct operating condition for the type of alarm initiating device and the location of the initiating device. This shall be confirmed also at the smoke control panel in the fire command center.

6. Manually override the operation of a sampling of fans and dampers during each test, taking care not to damage system components. Return all override switches to their “auto” position after each test.

909.10.4 Test reports. Within 30 days of completing any smoke control test, submit a test report to the Fire Department. A copy of the previous and current test reports shall be kept in the fire command center. The test report shall be written by the professional engineer who conducted the testing. The test report shall bear the seal and signature of the professional engineer. Any defects, modifications and repairs shall be

recorded in a log kept in the fire command center and at either the building management office or the maintenance office. The test report shall include, but is not limited to the following:

1. Provide a brief description of the smoke control system installed in the building being tested and state the year the building received its construction permit for the smoke control system. Provide a sequence of operation for the smoke control system.
2. Describe in general terms the equipment operating test procedures. Include a list of the equipment operating and smoke control test deficiencies along with a schedule of the proposed corrective action.
3. Describe detailed procedures followed during the equipment operating tests. Describe detailed procedures followed during the smoke control tests.
4. List test equipment used and outside air temperature and wind conditions at the time the smoke control tests were conducted.
5. State sequences and timing of the system operations during all smoke control tests (e.g., smoke detector activation time, fan start times, time for dampers to assume the correct position, etc.).
6. List the location of test measurements and the measured values for pressure differentials and door-opening forces for each test location.
7. Record any operational defects and performance deficiencies with respect to the requirements of this section, and state recommendations for corrective action. Include a schedule to re-test each deficiency. Submit results of any subsequent tests performed after completion of the corrective action.
8. Engineer's assessment indicating that the smoke control system, as installed and tested, conforms to the requirements of Section 909.

909.10.5 Functional test requirements for smoke control system e**quipment.** Testing of smoke control equipment shall be performed in accordance with this section to determine that the installed systems continue to operate in accordance with the *approved* design. Operational testing of the smoke control system shall include all equipment such as fans, dampers, controls, and doors. Testing shall include positive confirmation of actuation. System equipment and components shall be exercised for sufficient time to provide positive confirmation of proper operation or fault condition.

909.10.5.1 Written record. Results of the tests shall be documented in the building's life safety systems testing and maintenance log and printed reports generated during the automated testing. Testing documents must be maintained on-site in the fire command center or in a location *approved* by the *fire code official*.

909.10.5.2 Dedicated systems.

909.10.5.2.1 Dedicated systems shall be tested semiannually.

909.10.5.2.2 The smoke-control system shall be operationally tested as prescribed in Section 909.10.5. Dedicated smoke control systems shall be operated for each control sequence.

909.10.5.2.3 Operation of the correct outputs for each given input shall be verified and recorded.

909.10.5.3 Non-dedicated systems.

909.10.5.3.1 Non-dedicated systems shall be tested annually.

909.10.5.3.2 The smoke-control system shall be operationally tested as prescribed in Section 909.10.5. Nondedicated smoke control systems shall be operated on a representative sample of each type of equipment sufficient to verify proper operation for each control sequence. For high rise buildings, tests shall be conducted at a minimum of 15 percent of the smoke-controlled floors with a minimum of 3 floors, evenly spaced throughout the vertical sections of the building. Tests in subsequent years shall be conducted on previously untested floors, as may be practical so that all floors ultimately are tested. For all other buildings, tests shall be conducted at a minimum number of locations to demonstrate proper performance as *approved* by the Fire Department. Tests in subsequent years shall be conducted on previously untested locations, as may be practical, so that all locations ultimately are tested over a three-year period. Operation of the correct outputs for each given input shall be verified and recorded.

909.10.6 System repairs and maintenance. All deficiencies noted in the annual report shall be corrected within 30 days and, if required by the engineer, the smoke control system shall be re-tested. All smoke control systems will be maintained to perform its intended purpose under the code version with which it was built. With approval of the City of Englewood Building Department and the Englewood Fire Marshal's Office smoke control systems may be remodeled to comply with current code.

909.11 System acceptance. Buildings, or portions thereof, required by this code to comply with this section shall not be issued a certificate of occupancy until the provisions of this section have been fully complied with and the fire department has received satisfactory instruction on the operation, both automatic and manual, of the system.

Exception: In buildings of phased construction, a temporary certificate of occupancy shall be allowed provided that those portions of the building to be occupied meet the requirements of this section and that the remainder does not pose a significant hazard to the safety of the proposed occupants or adjacent buildings.

909.12 Smokeproof enclosures. For buildings required to comply with Sections 403 or 405 of the *City of Englewood Commercial Building Code*, a smokeproof enclosure shall consist of an enclosed, pressurized stairway or ramp conforming to Section 909.15.1 and 1023.11 of the *City of Englewood Commercial Building Code* and this Section.

909.12.1 Ventilation systems. Smokeproof enclosure ventilation systems shall be independent of other building ventilation systems. The equipment and ductwork shall comply with one of the following:

1. Equipment and ductwork shall be located exterior to the building and directly connected to the smoke proof enclosure or connected to the smoke proof enclosure by ductwork enclosed by two-hour fire barriers.
2. Equipment and ductwork shall be located within the smoke proof enclosure with intake or exhaust directly from and to the outside or through ductwork enclosed by two-hour fire barriers.
3. Equipment and ductwork shall be located within the building if separated from the remainder of the building, including other mechanical equipment, by two-hour fire barriers.

909.13 Design criteria. All smoke control systems shall comply with the requirements of Sections 909.13.1 through 909.13.10. All equipment shall have local operating controls disabled when in smoke control mode. Equipment internal faults shall not cause shutdown of the smoke control equipment unless *approved* in writing by the *fire code official*. Equipment including, but not limited to, fans, current transducers (CT's), differential pressure transmitters, sail switches, ducts, duct protecting materials, automatic dampers, balance dampers, actuators, linkage, limit switches and motor controllers shall be suitable for their intended use. Equipment functions and operating characteristics shall not detract from the smoke control systems' stable and reliable performance. Upon smoke control activation, VFD's shall operate in override or life safety mode where

faceplate commands and non-smoke control commands are ignored. In addition, non-critical faults (safeties) shall be ignored to ensure the continued and stable performance of the smoke control fan.

909.13.1 Minimum pressure differential. The minimum pressure differential across stairway and hoistway smokeproof enclosures on fire floors, shall be +0.05-inch water gauge (0.0124 kPa) with pressurization fans turned on and fire floor in exhaust mode. Where elevator lobbies are provided, the pressure differential shall be measured between the pressurized lobby and fire floor with pressurization fans turned on and fire floor in exhaust mode. Minimum operating performance of pressurization fans shall not be less than 12 Hz for VFD's or the motor control's minimum manufacturer published rating.

909.13.2 Maximum door opening force. The maximum pressure difference across a smoke barrier or smoke zone and an opening into a stair enclosure shall be determined by the required door-opening forces. Door opening force shall not exceed 30 pounds applied horizontally at the latch side of the door on the door-opening device under any operating condition. Maximum door opening force shall not exceed 15 pounds at stairway entry doors during a non-fire mode of operation. Opening force at elevator lobby doors shall comply with *City of Englewood Commercial Building Code* and be measured on the fire floor with the hoistway pressurization fans turned on and fire floor in exhaust mode.

909.13.3 Resistance to smoke recirculation. Locate outdoor air intakes for pressurization systems remote from points of discharge for smoke exhaust systems in order to minimize the potential for recirculation of smoke to the outdoor air intakes. The minimum separation distance shall be 10 feet in any direction.

909.13.4 Determination of the volume of a space. The volume of a given building element shall be defined as the space that is contained between the finished floor slab(s) of one level and the underside of the floor or roof element above, and the walls or partitions that form the boundaries of the space.

909.13.5 Fire/Smoke damper temperature rating. The temperature rating for the thermal element in fire and combination fire/smoke dampers, where they are applied in smoke exhaust systems, shall be no less than 250 degree ° F. For systems where the probable temperature rise to which the damper will be exposed may be higher than 250 degree ° F the temperature shall be computed by an *approved* method.

909.13.6 Fans. In addition to other requirements, belt-driven fans shall have 1.5 times the number of belts required for the design duty, with the minimum number of belts being two. Fans shall be selected for stable performance based on normal temperature and, where applicable, elevated temperature. Calculations and manufacturer's fan curves shall be part of the documentation procedures. Fans shall be supported in accordance with Chapter 16 of the *City of Englewood Commercial Building Code*. Motors driving fans shall not be operated beyond their nameplate horsepower (kilowatts), as determined from measurement of actual current draw, and shall have a minimum service factor of 1.15.

909.13.7 Motor controllers and variable frequency drives (VFDs). Motor controllers and variable frequency drives (VFDs) provided to operate fans of smoke exhaust and pressurization systems shall be installed in secure, conditioned and protected locations. These devices shall be located in a room or space separated from the remainder of the building by a 1-hour fire-resistance rated fire barrier. Power wiring and control wiring between switchgear and /or panels, motor controllers, VFDs and smoke control system motors and control dampers shall be in non-flexible metallic raceway up to the component connection. VFDs for smoke control system fans shall not be equipped with a manual or automatic bypass switch except where fans are designed and set for 60 hertz, nominal.

Exception: The final connection to the component shall be made with the appropriate flexible conduit in accordance with NFPA 70 (NEC).

909.13.8 Ducts. Duct materials and joints shall be capable of withstanding the probable temperatures and pressures to which they are exposed during smoke control operating conditions. Ducts shall be constructed and supported in accordance with the *City of Englewood Mechanical Code*. Ducts shall be leak tested to

1.5 times the maximum design pressure in accordance with nationally accepted practices. Measured leakage shall not exceed 5 percent of design flow. Results of such testing shall be a part of the documentation procedure. Ducts shall be supported directly from fire-resistance-rated structural elements of the building by substantial, noncombustible supports.

Exception: Flexible connections (for the purpose of vibration isolation) complying with the *City of Englewood Mechanical Code*, that are constructed of *approved* fire-resistance-rated materials.

909.13.9 Equipment, inlets and outlets. Equipment shall be located so as to not expose uninvolved portions of the building to an additional fire hazard. Outside air inlets shall be located so as to minimize the potential for introducing smoke or flame into the building. Exhaust outlets shall be so located as to minimize reintroduction of smoke into the building and to limit exposure of the building or adjacent buildings to an additional fire hazard.

909.13.9.1 Vegetated roofs. Stairway and hoistway pressurization system intakes shall be separated by a minimum of 15 feet from vegetated areas.

909.13.10 Automatic dampers. Automatic dampers, regardless of the purpose for which they are installed within the smoke control system, shall be listed and conform to the requirements of *approved*, recognized standards.

909.14. Smoke control systems for atriums (where required by Section 404 of the City of Englewood Commercial Building Code).

909.14.1 Requirements. The operation of the smoke control systems shall be controlled through the fire alarm system and shall comply with the requirements of this Section. The atrium volume shall include all spaces not separated from the atrium by the provisions of Section 404.6 of the *City of Englewood Commercial Building Code*.

909.14.2 Operation. Where required by Section 907.2.14**,** activation of initiating devices shall cause the following sequence to occur:

1. Open atrium exhaust dampers.
2. Open supply dampers to atrium.
3. Close exhaust dampers on all adjacent smoke zones.
4. Start exhaust fans.

909.14.3 Atrium exhaust. The system shall exhaust a minimum of six air changes per hour. A minimum of 50 percent of the volume of supply air shall be sized and introduced via gravity supply or fan powered inlets within 10 feet of the lowest level of the atrium. The total volume of supply air shall be 75 percent of the required volume of exhaust air. A maximum velocity of 200 feet per minute shall be maintained across the net free area of the supply air openings.

909.14.4 Exhaust openings. Atrium exhaust openings shall be located in the ceiling or in a smoke trap area immediately adjacent to the ceiling at the top of the atrium. The lowest level of the exhaust openings shall be above the top of the highest elevation of door openings into the atrium.

909.15 Smoke control systems for high-rise buildings.

909.15.1 Stairway pressurization systems.

909.15.1.1 Requirements. Where the uppermost landing of an exit enclosure serves an occupiable floor located more than 75 feet above the lowest level of fire department vehicle access road, the stairway enclosure and associated exit passageway shall be mechanically pressurized with outdoor air,

via one or more separate, dedicated pressurization systems. The operation of each stairway pressurization system shall be controlled through the fire alarm system. Fire, smoke, or fire/smoke dampers are prohibited in stairway pressurization systems. Isolation dampers are permitted in the outdoor air intake ductwork, where such dampers are provided with a hard-wired interlock with the drive or starter, that proves "damper open" position, and that the damper is configured to "fail" open from a control standpoint. Each stairway pressurization system shall be enclosed in an *approved* two-hour fire-resistive rated fire barrier and/or horizontal assembly from the outdoor air intake to the stairway enclosure penetration. Ductwork shall not be required within the stairway enclosure.

Exception: Where ductwork is not provided for stairway pressurization, stairway shaft leakage shall not exceed 10 percent of actual supply, exclusive of the door leakage.

909.15.1.2 Operation. Each fan discharge shall be provided with a duct smoke detector that shall annunciate a supervisory signal at the fire command center (graphic annunciator) and shall illuminate a lamp adjacent to the fan status indicator at the firefighter's smoke control panel. The capability to manually override the operation of each fan shall be provided to the Fire Department personnel in the fire command center. Fans shall not shut off until manually overridden by Fire Department personnel or until the fire alarm system is reset. Each stairway pressurization system shall indicate that the system is moving air at the firefighter's smoke control panel in accordance with Appendix O. Monitoring of air flow is permitted to be accomplished with torque indication on a variable frequency drive, differential pressure across the fan or current switches on the power feed to the fan. Variable frequency drives used for smoke control systems shall not be required to be UUKL listed. The drive shall not fail to a greater capacity than that associated with the control setpoint for the fan.

909.15.1.3 Design. The air volume introduced into the stairway shall be as follows: 15 floors or less, at least 800 cfm per floor; 16 floors or more, at least 10,000 cfm, plus 200 cfm per floor in excess of 15 floors with 0.5-inch water column static pressure minimum at the duct penetration into the stairway. In order to comply with the requirements of Section 909.13, dynamic static pressure control shall be provided for stairway pressurization fans. Either dynamic static pressure or fixed speed controls shall be provided. Dynamic static pressure controls are permitted to be tuned and set to a fixed value. Air for the stairways serving buildings where the uppermost occupied floor is more than 120 feet above the lowest level of fire department vehicle access shall be introduced into the stairway at a minimum of two injection points. One injection point shall be located not more than 50 feet above the grade plane. In buildings where the uppermost landing of an exit enclosure serves an occupiable floor located more than 250 feet above the lowest level of fire department vehicle access, an engineered design shall be required.

909.15.2 Hoistway pressurization systems.

909.15.2.1 Requirements. Each elevator hoistway with a total rise of 75 feet or more or any elevator hoistway serving any occupiable floor located more than 75 feet above the lowest level of fire department vehicle access shall be mechanically pressurized with outdoor air, via one or more ~~a~~ separate, dedicated pressurization systems in accordance with Section 909.15.1.1. Where hoistway pressurization is provided in lieu of required enclosed elevator lobbies in any building as permitted by Section 3006.3 Item 4 of the *City of Englewood Commercial Building Code*, design shall comply with provisions of Section 909.15.2.3

909.15.2.2 Operation. System operation shall comply with Section 909.15.1.2.

909.15.2.3 Design. The air volume introduced into the elevator hoistway shall be as follows: 15 floors or less, at least 900 cfm per floor, plus 270 CFM per door opening, with 0.5-inch water column static pressure minimum at the duct penetration into the hoistway; 16 floors or more, at least 13,500 cfm, plus 270 cfm per door opening, with 0.5-inch w.c. static pressure minimum at duct penetration into the

hoistway. In order to comply with the requirements of Section 909.13, dynamic static pressure control shall be provided for hoistway pressurization fans. Dynamic static pressure or fixed speed controls shall be provided. Dynamic static pressure controls are permitted to be tuned and set for a fixed value. In buildings where the uppermost elevator landing serves an occupiable floor located more than 250 feet above the lowest level of fire department vehicle access, an engineered design shall be required. Hoistway pressurization system performance shall not interfere with the opening and closing of elevator doors. Refer to Chapter 30 of the *City of Englewood Commercial Building Code* for door operation.

909.15.2.4 Smoke venting to exterior. Smoke venting of pressurized elevator hoistways to the exterior of the building shall not be required.

909.15.2.5 Elevator machine rooms. Elevator machine rooms may be pressurized indirectly via the elevator hoistway pressurization system through the cable slots in the machine room floor.

909.15.2.6 Lobby/ Areas of rescue assistance. Elevator lobbies designated as areas of rescue assistance are permitted to have the elevator lobby/area of rescue assistance pressurized using the elevator hoistway pressurization system by transferring air to the elevator lobby area of rescue assistance from the hoistway. The lobby/area of rescue assistance shall be pressurized by the transfer of air from the pressurized hoistway through the leakage at the elevator doors. Where *approved* by the *fire code official*, use of transfer openings protected with fire/smoke dampers between the hoistway and the lobby/area of rescue assistance is also acceptable.

909.15.3 Smoke exhaust systems.

909.15.3.1 Requirements. Smoke exhaust system(s) shall be provided in high-rise buildings system shall be controlled via the fire alarm system, to operate in conjunction with the other applicable smoke control systems for the building, in order to achieve the objectives as follows:

1. To maintain a zone of negative pressure in the fire floor (or smoke zone) relative to the other floors or adjacent smoke zones, means of egress stair enclosures and elevator lobby/refuge areas; and...
2. To maintain a maximum stair enclosure or smoke barrier door opening force on the fire floor or smoke zone in alarm. The prescriptive approach described herein is not intended to preclude the use of a performance-based smoke control approach, such as that defined by NFPA 92.
3. Maintenance of tenable environment is not required in the immediate area of fire origin.
4. Shall demonstrate the continual reduction of smoke concentrations from the smoke zone of origin per Section 909.10.1 Item 7.

909.15.3.2 Configuration. Smoke exhaust systems shall include motorized combination fire/smoke dampers or a motorized smoke and a fire damper on each floor of a multi-level building served by the system(s). The exhaust damper(s) in the fire floor smoke zone in alarm shall be commanded open, in order to exhaust that zone, and the smoke exhaust fan commanded to "ON". The exhaust dampers in other smoke zones shall be driven to, or shall remain in, the closed position. The use of smoke dampers shall not preclude the provision of fire dampers, where required by other sections of this code. Exhaust damper(s) shall be located within the upper third of the finish floor height.

909.15.3.3 Design criteria. The general building smoke exhaust system(s) for each floor/smoke zone shall be sized in accordance with the following:

1. The smoke exhaust system shall be sized to remove a minimum of 5 air changes per hour on the fire floor in Occupancy Groups A, B, E and M.

2. The smoke exhaust system shall be sized to remove a minimum of 15 air changes per hour in the typical floor corridors, the typical floor corridors/elevator lobbies, or the typical floor

elevator lobbies in Occupancy Groups R-1, R-2, I-1 and I-3. Amenity spaces less than 3,000 square feet in Groups R-1 and R-2 occupancies are not required to be provided with a separate smoke exhaust system.

3. That appropriate consideration shall be made for damper leakage on non-fire floors connected to a central riser system, when selecting the smoke exhaust fan(s).
4. Smoke exhaust systems shall be in ducts constructed in accordance with Section 909.13.8.
5. The engineer shall design make-up air to be available to the smoke zone in alarm so exhaust rates satisfy 909.10.1 Item 8. Submittal documentation shall include analysis presenting methodology for achieving such.

909.15.3.4 Operation. Upon activation of an automatic alarm initiating device as described in Section 907, the following smoke control sequence shall occur:

1. Turn off all supply and make-up air fans, unless used to afford make-up air to the smoke exhaust zone.
2. Open exhaust dampers on the zone in alarm.
3. Close smoke exhaust dampers to all other smoke zones.
4. Close all supply air dampers, unless used to afford make-up air to the smoke exhaust zone.
5. Initiate stairway and elevator hoistway pressurization sequences in accordance with Sections 909.15.1 and 909.15.2.
6. Start exhaust fans.

909.15.4 Street level tenant exception. Smoke exhaust systems shall not be required to serve individual tenant areas or lobbies located on the level of building egress.

909.15.5 Small assembly areas or similar uses exception. Smoke exhaust for assembly areas or similar uses 3,000sf (278m^2) or less in cumulative size for the floorplate shall not be required when these areas are separated by smoke partitions constructed in accordance with Section 710 of the *City of Englewood Commercial Building Code*.

909.16 Smoke control systems for parking garages within high rise structures.

909.16.1 Requirements. Elevator lobbies designated as refuge areas on all floors within an enclosed parking structure shall have the elevator lobby/refuge area pressurized using the elevator hoistway pressurization system by transferring air to the elevator lobby/refuge area. Use of transfer openings protected with fire/smoke dampers between the hoistway and the lobby/refuge area is acceptable.

909.16.2 Open parking garages. A general building smoke control system shall not be required for elevator lobbies that are enclosed and that serve an open parking garage, if direct access without stairs or obstructions is available for people with special needs to exit from the elevator lobby to the open parking garage level or directly to a public way.

909.16.3 Enclosed garages. Exhaust fans associated with an enclosed parking structure shall be capable of manual operation from the smoke control panel. Such exhaust fans will not require a redundant source of electrical power, and this shall be indicated at the smoke control panel with the words, **"Not on Emergency Power."**

909.17 Smoke exhaust. Smoke exhaust for assembly occupancies with 1,000 occupants or more in high-rise buildings, stages and areas in accordance with Section 410 of the City of Englewood Commercial Building Code, and underground buildings shall comply with Sections 909.17.1 through 909.17.3.1.

909.17.1 Requirements. Each area shall be separated into smoke zones not to exceed 52,000 square feet on a single floor. Smoke zones shall be separated from each other by walls that extend from the floor to the underside of the floor or roof above except for the following:

1. Openings into atriums.
2. Pedestrian bridges between two buildings.
3. Non-required stair enclosures between floors.
4. Open escalators between multiple floors.
5. Where draft stops as prescribed in Section 909.17.2.1 are provided.

909.17.2 Design criteria. Building construction shall be configured in order to support the performance of the smoke exhaust system, in accordance with the following:

1. Where wall separation is not provided between smoke zones, draft stops shall be provided. The configuration of the draft stops shall be as *approved* by the Building and Fire Departments.
2. A smoke zone in alarm shall actuate the respective smoke exhaust system, while smoke exhaust systems in adjacent smoke zones remains inactive.
3. Where smoke zones have wall separations, a positive static pressure differential shall be maintained between adjacent non-alarm zones, relative to the smoke zone in alarm.
4. Sprinkler and smoke detection zones shall coincide with smoke zones.
5. Products of combustion must be demonstrated to be contained within the zone of origin, for smoke zones without wall separations. Failure to restrict products of combustion to the floor or area of origin shall be considered non-compliant with the performance requirements for the smoke exhaust system.

909.17.2. Assembly area smoke zones shall be separated from adjacent zones by draft stops located immediately adjacent to each smoke zone. The draft stops shall be at least 18 inches deep. The draft stops shall be of non-combustible or limited combustible material that will stay in place before and during sprinkler operation.

Exception: Assembly areas smoke zone separation from adjacent smoke zones is not required for ceiling heights 18 feet and greater.

909.17.3 Design criteria. The smoke exhaust system shall exhaust a minimum of six air changes per hour.

909.17.3.1 Operation. Upon activation of a fire alarm initiating device in accordance with Section 907, smoke control operation shall comply with the following:

1. Open exhaust dampers for smoke zone in alarm
2. Start smoke zone exhaust fans
3. Close supply dampers to smoke zone in alarm
4. Adjacent zones go to 100 percent outside air

5. All other systems maintain normal operation

909.18 Reserved.

909.19 Smoke control systems for covered mall buildings. Where required by Section 402 of the *International Building Code*, smoke control systems shall comply with Section 909.14.

909.20 Alteration of smoke control systems in existing high-rise buildings. Smoke control systems shall be maintained in operational condition as required by the code under which the system was installed. The system alteration may be considered for application under this code with approval by the *fire code official*, provided that; the building is fully protected by automatic sprinklers complying with current NFPA 13 provisions for high rise buildings, the building has complying standpipes, and smoke detection is provided in accordance with Section 907.2.13.1.1. Upon approval, the altered configuration shall be considered the new requirement and documented as *approved* by the City of Englewood Building Department and the Englewood Fire Marshal's Office. Future work shall not be allowed to adversely affect the performance of the system. Construction drawings and system sequence of operation shall be submitted for approval in accordance with Appendix O.

SECTION 910
SMOKE AND HEAT REMOVAL

Section 910.3.1 Listing and labeling is replaced in its entirety as follows:

910.3.1 Listing and labeling. Smoke and heat vents shall be *listed* and labeled to indicate compliance with UL 793 or FM 4430.

Exception: Gravity-operated drop out vents are not permitted.

Section 910.3.6 Smoke and heat vent fall protection and its subsection are added as follows:

910.3.6 Smoke and heat vent fall protection. In Group F, M, and S occupancies fall protection shall be provided meeting minimum requirements of Sections 910.3.4.1 and 1108 Items 1, 2 and 3.

910.3.6.1 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 per square foot applied perpendicularly at any one area on the screen. Covers shall be secured in place to prevent accidental removal or displacement. Opening limitation shall be not more than 6 inches in diameter or of slatwork with openings not more than 2 inches wide with length unrestricted.

SECTION 912
FIRE DEPARTMENT CONNECTIONS

Section 912.2 Location is replaced in its entirety as follows:

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 912.4.1 Locking fire department connection caps is replaced as follows:

912.4.1 Locking fire department connection caps. To prevent vandalism & theft, locking connection caps protecting the inlet and swivel shall be provided and compatible with FMO key box keys

Section 912.6 Backflow protection is replaced in its entirety as follows:

912.6 Backflow protection and main flow switch. A backflow preventer and flow switch shall be installed on all potable water supply mains serving all *automatic sprinkler systems*.

Exception: Subject to the *fire code official*, backflow prevention and a main flow switch may be omitted on automatic sprinkler systems installed as part of a domestic water supply system.

The backflow preventer shall be installed within 5 feet (610 mm) of the point where the main first penetrates the envelope of the building or structure. The main flow switch shall be installed within 2 feet (610 mm) on the system side of the backflow preventer and in addition to all other flow switches required by this code. The automatic sprinkler system shall be configured so that only one flow switch activates an alarm condition by the actuation of a single sprinkler. When the main and other downstream flow switches can be triggered sequentially by the activation of a single sprinkler, only the flow switch closest to that sprinkler shall be monitored as alarm and actuate exterior notification in accordance with Section 903.4.2; the other sequential flow switches shall be monitored as supervisory.

SECTION 913
FIRE PUMPS

Section 913.1 General is replaced as follows:

913.1 General. Where provided, fire pumps for fire protection systems 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.

Exception: Pumps for automatic sprinkler systems install in accordance with Section 903.3.1.3.

Section 913.2 Protection against interruption of service is replaced as follows:

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.

Exception: This section shall not apply to cables, or portions of cables, located within a fire pump room or generator room that is separated from the remainder of the occupancy with fire-resistance-rated construction.

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 Fire pump requirement for non-high-rise buildings and its subsection are 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 emergency response personnel 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 175 psi at the fire department connection (FDC). All system components shall be listed and rated for system working pressure.

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 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 915
CARBON MONOXIDE DETECTION

Section 915.1.7 Central fuel burning appliances and equipment is added as follows:

915.5 Central fuel burning appliances and equipment. Carbon monoxide detection systems shall be provided for buildings containing a central fuel-burning appliance. The carbon monoxide detection system shall be monitored by the building fire alarm system, where provided. This requirement applies to any new equipment installation for which a permit is required by the Building Department.

Exception: Carbon monoxide detectors are not required for listed fuel-burning cooking appliances.

Section 915.2.4 Central fuel-burning appliances is added as follows:

915.2.4 Central fuel-burning appliances. System carbon monoxide detectors are required for each room containing a central fuel-burning appliance and shall be located within 25 feet of any fuel-burning appliance. This requirement supersedes the locations specified in NFPA 720.

Section 915.5.4 System type carbon monoxide detectors is added as follows:

915.5.4 System type carbon monoxide detectors. Carbon monoxide detectors shall transmit to the central station and be relayed to FMO Dispatch as a separate/distinct signal.

SECTION 916
GAS DETECTION SYSTEMS

Section 916.2.1 Construction documents is replaced as follows:

916.2.1 Construction documents. Documentation of the gas detection system design and equipment to be used that demonstrates compliance with the requirements of this code shall be provided with the application for permit. Shop drawings for gas detection systems shall be submitted for permit application as deferred submittal in accordance with Section 133.-4 of the Administration of the City of Englewood Building Code. Plan review and approval are required prior to issuance of a permit for system installation. Submittals shall comply with Appendix O.

Section 916.3 Equipment is replaced as follows:

916.3 Equipment. Gas detection system equipment shall be designed for use with the gases being detected and shall be installed in accordance with manufacturer's instructions. Separate gas detection system control panels monitored by the building fire or sprinkler alarm control panel, or gas detection system control panels installed in buildings without a fire or sprinkler alarm system are permitted. Where permitted, separate gas detection system control panels shall be installed in *approved* location outside of the potentially contaminated areas. Multiple separate gas detection system alarm control panels are permitted; however, areas protected by a single gas detection system alarm control panel shall be contiguous. The gas detection control unit shall provide a readout displaying the concentration of gas detected.

Section 916.4 Power connections is replaced as follows:

916.4 Power Connections. Gas detection systems shall be permanently connected to the building electrical power supply on a locked dedicated circuit or shall be permitted to be cord connected to an unswitched receptacle using an *approved* restraining means that secures the plug to the receptacle.

Section 916.8 System Activation is replaced as follows:

916.8 System Activation. A gas detection alarm shall be initiated where any sensor detects a concentration of gas exceeding the following thresholds:

1. For flammable gases, as gas concentration exceeding 25 percent of the lower flammability limit (LFL).
2. For nonflammable gases, a gas concentration exceeding one-half of the IDLH, unless a different threshold is specified by the section of this code requiring a gas detection system.

Upon activation of a gas detection alarm, alarm signals or other required responses shall be as specified by the section of the code requiring a gas detection system.

Section 916.8.1 Audible and visible alarm signals is added as follows:

916.8.1 Audible and visible alarm signals. Audible and visible gas detection system notification appliances shall be installed on the interior and exterior of the areas required by this code to have a gas detection system per the notification requirements of the NFPA 72 with the exception of CO2 and inert gases in section 5307.

Audible 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 inside or entering the potentially contaminated area.

Audible gas detection system notification shall have tone and pattern distinctly different from fire alarm and carbon monoxide alarm signals. 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 areas is not required provided the potential for migration of the hazard to other occupied areas is small.

Section 916.9 Signage is replaced as follows:

916.9 Signage. Signs shall be provided adjacent to gas detection system alarm notification appliances to advise occupants of the nature of the signals and actions to take in response to the signal. Signage shall be placed adjacent to all such notification appliances. The sign shall have a minimum 2-inch (50-mm)block lettering with a minimum one-half-inch (13-mm) stroke unless otherwise *approved* by the *fire code official*. 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 916.10 Fire alarm system connections is replaced as follows:

916.10 Fire alarm system connections. Gas detection systems shall be monitored by the building fire or sprinkler alarm control panel, where provided. A gas detection system shall be annunciated as a separate zone on the building annunciator, shall be transmitted to the central station as a separate and distinct signal, and shall be relayed to FMO dispatch as such. Where multiple gas detection 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. Floor plans of the area protected by a gas detection 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 a gas detection system, directory-style LED annunciation shall be provided at the gas detection system control panel and at the fire alarm control panel, if provided. Supervisory and trouble signals shall be annunciated separately with yellow LEDs and alarm signals shall be annunciated with red LEDs.

Section 918 Central Alarm Stations is added as follows:

SECTION 918
CENTRAL ALARM STATIONS

918.1 General. Where required by Section 907.1.6 as amended, 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 Englewood Police Department Dispatch.

918.2 Communication methods. Communication from a protected premise to a central alarm ~~s~~tation 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.

918.3 Transmission channels. Transmission channels between a protected premises and central alarm stations shall consist of one of the methods of Sections 918.3.1, 918.3.2, 918.3.3 or as *approved* in accordance with Section 918.2 for performance-based technologies. Transmission channels shall be monitored for integrity in accordance with NFPA 72.

918.3.1 DACT transmission. For existing buildings, 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, a minimum one-way private radio alarm system complying with Section 918.3.3 or an *approved* alternative communication technology in accordance with Section 918.2.

918.3.2 RF multiplex systems. 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 918.3.1. 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.

918.3 One-way private radio alarm systems. 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.

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Section 918.4 Runner service is added as follows:

918.4 Runner service. Central stations licensed by the City of Englewood shall provide runner service to all properties monitored, in accordance with NFPA 72.

Section 919 Transmission of City Microwave Signals is added as follows:

SECTION 919

TRANSMISSION OF CITY MICROWAVE SIGNALS

919.1 General. Construction permits shall not be issued and inspections will not be approved 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 Department of Public Safety. A service

agreement must also be approved by the Department of Public Safety 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 920 Elevators and Conveying Systems is added as follows:

SECTION 920
ELEVATORS AND CONVEYING SYSTEMS

920.1 General. Elevators and other conveyances shall comply with this code, referenced codes and standards, Colorado State Regulation 7CCR 1101-8, FMO Policy 920.1 and the applicable equipment installation and maintenance standards.

920.1.1 Modification or alteration in conveyance structural elements. Engineered installation shop drawings, specifications, analysis and calculations for structural field modification or alteration to a conveyance shall be submitted to the *fire code official* for review and approval. Drawings shall include all connections impacted by the modification or alteration. All submittals shall bear the stamp and signature of a structural engineer registered in the State of Colorado. Technical assistance shall be provided as required by the *fire code official* to evaluate submittals for adequacy. Special inspection of all field welds shall be required for quality control. All welding shall be performed by appropriately certified personnel. Costs for technical assistance and special inspections shall be borne by the installation contractor. Field modification or alteration of conveyance structural elements is not permitted without approval from the *fire code official*.

920.2 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 Appendix O. Colorado State registration is not required for residential conveyances and temporary construction elevators.

920.3 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 920.2. Conveyances shall have a valid Colorado State registration number, a current Certificate of Operation, and Operational Permit prior to approval of any alterations. Colorado State registration is not required for residential conveyances and temporary construction elevators. Operational permits are not required for dormant conveyances.

920.4 Removal from service. Permits shall be obtained from the fire department prior to any conveyance being removed from service, made dormant or otherwise rendered inoperable. If an entire building is being demolished a valid demolition permit issued by the City of Englewood shall be accepted as verification of a conveyance being removed from service and may eliminate the need for a permit for removal to be obtained.

920.5 Annual conveyance operating permit. All buildings or facilities where an elevator, escalator, or AGTS are located shall obtain an annual conveyance Operational/Certificate of Operation permit in accordance with FMO policy 920.5. No conveyance shall be operated without a valid Operational/Certificate of Operation permit. Elevators, escalators, and the AGTS operating without a current Operational/Certificate of Operation will be subject to double Operational Permit fees. Conveyance contractors shall not perform maintenance, replace components, conduct repair work or perform testing on elevators, escalators, or AGTS that do not have a current Operational/Certificate of Operation permit

Exceptions:

1. Conveyances issued a Construction Use Certificate of Operation when operating under the terms of that Certificate.

2. Residential elevators complying with Section 920.20.

920.5.1 Change in contact information. The conveyance owner shall be responsible for notifying the Administrator of any change in ownership or management contact information within 30 days of the change.

920.6 Standardized key switches. All elevators shall be provided with standardized key switches for emergency operation in accordance with Section 606.8.1.

920.7 Venting of hydraulic tanks located in hoistways. 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 in accordance with FMO Policy 9920.7.

920.8 Emergency and standby power. Where emergency or standby power is provided to elevators or other conveyances as required by this code, the *City of Englewood Commercial Building Code*, other applicable standards or voluntarily, installation and operation shall comply with Sections 604 and 606.

Exception: Where emergency or standby power is required for platform lifts as part of an accessible means of egress in accordance with Section 1009.5 of the *City of Englewood Commercial Building Code*, 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.

920.8.1 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.

920.9 Fire service access elevators. Where required by the *City of Englewood Commercial 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 Section 3007 of the *City of Englewood Commercial Building Code*. 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*. The CCTV screen shall be integrated into the elevator status panel and shall measure a minimum of 9-inch diagonally. Shunt trip operation shall not be permitted for fire service access elevators.

920.9.1 Fire Service Access Elevators. A pictorial symbol designating the fire service access elevator(s) shall be installed on the jambs at the designated landing in accordance with FMO Policy. Existing Fire Service Access Elevators shall have this symbol installed at the designated landing.

920.10 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.

920.11 "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*.

920.12 Elevator firefighter indicator. The operation of the elevator firefighter indicator (firefighter hat symbol) shall comply with Section 907.3.3.5.

920.13 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 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.

920.14 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. Two-way communication system from the elevator to the Fire Command Center shall be incorporated on the elevator status panel.

920.15 Inspections. Conveyance annual and periodic inspections shall comply with State Conveyance Regulations 7CCR 1101-8, manufacturer's specifications, the Maintenance Control Program and this code.

920.15.1 Inspection. All conveyances shall be inspected annually.

920.15.2 Certificate of operation. A conveyance shall not operate unless the conveyance owner maintains a current certificate of operation for the conveyance. The certificate of operation shall be available for review at the property where the conveyance is located.

920.15.3 Inspection submittal. Licensed Conveyance Inspectors shall submit complete and accurate inspection reports to FMO Conveyance Program within 5 business days of the inspection

920.16 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.

920.17 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 *City of Englewood Commercial Building Code*.

920.18 Automated Guideway Transportation Systems (AGTS). AGTS shall comply with Sections 920.2, 920.3, 920.5, and ASME 21 as adopted by the State of Colorado.

920.19 Conveyances used during construction. Elevators and personnel hoists used during construction shall comply with ASME A17.1 Section 5.10, ANSI A10.4 and FMO Policy920.5. Upon installation or modification, certification shall be provided to the Department 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.

920.19.1 Door locking devices. Electro-mechanical hoistway door interlocks shall be provided at all landings.

920.20 Residential elevators. All elevators used in private residences shall comply with ASME A17.1 Section 5.3 and FMO policy 920.2-01. Installation or alteration of an elevator in a private residence shall be submitted for approval in accordance with Section 920.2 or Section 920.3.

920.20.1 Certificate of operation. Residential elevators are required to have a current Certificate of Operation issued by the FMO Conveyance Program . Certificates shall be valid for a period of three years and shall require submission to the Department of an inspection affidavit signed by a licensed inspector prior to issuance or renewal.

920.21 Elevator Identification. Where more than one elevator exists, the alphabetical or numerical identification of the elevator shall be placed on both doorjambs of every elevator entrance at the designated level, alternate level, level where means necessary for tests is provided, and level test panel is provided; this

identification shall be a minimum of two inches (50 mm) in height and shall be located immediately below the floor designation, where provided.

920.22 Elevator contractor response. Following an elevator entrapment where fire crews have responded and require the assistance of elevator personnel, the onsite incident commander (IC) or building responsible party shall notify the elevator contractor of record through the contractor's emergency dispatch center that a licensed conveyance mechanic is required onsite to give guidance to emergency personnel on extracting entrapped passengers.

In response, the elevator contractor of record shall:

1. Dispatch a licensed conveyance mechanic to the site; and,
2. The elevator mechanic shall be onsite within one hour.

Building owners or their designee are responsible for posting the name of the elevator contractor of record and its emergency dispatch center or other contact number(s). The elevator contractors contact information shall be provided in durable construction, easily readable in normal lighting, protected by a smooth, transparent, plastic surface and be located at the following locations.

1. Fire Command Center (FCC) where provided or,
2. Adhered to the inside cover of the Fire Alarm Control Panel (FACP) when no FCC is present, or,
3. In the elevator Machine Room, if no FACP is present.

Only a licensed conveyance mechanic shall restore power and place the conveyance back into service after verifying the conveyance is safe for public use in accordance with Section 920.5, following an event where power to a conveyance was removed by emergency response personnel.

920.23 Disconnect location. The Licensed Elevator Contractor shall ensure the location of each elevator electrical disconnect is detailed on a matrix and included on the graphic map in accordance with Section 907.6.4.1.1.1. The matrix shall be posted within a display of durable construction, easily readable in normal lighting, protected by a smooth, transparent plastic surface and shall include the following information.

1. The floor number(s) that the disconnect(s) are located
2. Which elevator the disconnect operates
3. Room name/number

This display shall be located in the fire command center adjacent to elevator panels where provided or next to the fire alarm control panel.

920.23.1 Existing Elevators. Existing elevators shall conform with Section 920.23 by January 1, 2024

920.24 Fire-rated suspension and controller replacements. Noncircular elastomeric-coated or polyurethane-coated steel belts used in new elevator installations and alterations shall be fire rated. Coated steel belts utilized in existing elevators shall be replaced with the fire-rated type at time of suspension means or controller replacement. The fire rating shall not be less than an FT-1 rating when tested to the vertical burn test requirements of UL 2556, Wire and Cable Test Methods, where the suspension means shall not continue to burn for more than 60 seconds, nor shall the indicator flag be burned more than 25 percent.

CHAPTER 10
MEANS OF EGRESS

Chapter 10 of the International Fire Code is amended in accordance with Chapter 10 of the City of Englewood Commercial Building Code.

CHAPTER 11
CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

SECTION 1101
GENERAL

Section 1101.1 Scope is replaced as follows:

1101.1 Scope. The provisions of this chapter shall apply to existing buildings constructed prior to the adoption of this code when the applicable requirements for such buildings cannot be ascertained by the following:

1. The building and fire codes in effect when the building was permitted for construction and no change of occupancy occurred since that time.
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 Section 106 of the Administration of the City of Englewood Building Code.
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.

1101.1.1 Existing buildings. Existing buildings shall comply with the requirements of Sections 1103.2, 1103.3, 1103.7.5, 1103.9, 1107, and 1108.

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 where such existing buildings do not comply with the minimum requirements of the City of Englewood Building Code. It is intended for existing buildings to comply under the Code which it was constructed, certified for occupancy, any alternate means of Code compliance approvals, and retrofit / retroactive Codes previously adopted.

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 510.1.2.

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 firefighting or rescue purposes shall be provided with emergency operation in accordance with *Colorado State Regulations.*

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 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. 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:

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:

Where *approved*, replacement and new CO alarms shall be UL 2034 listed battery-operated CO alarms provided with permanent integral 10-year lithium batteries.

Section 1103.9.1 Central fuel burning appliance rooms is added as follows:

1103.9.1 Central fuel burning appliance rooms. Carbon monoxide detectors monitored by the building fire alarm system shall be installed in central fuel burning appliance rooms in existing buildings containing a fuel burning appliance for which an installation permit was issued by the Building Department after **July 1, 2009**. Each central fuel-burning appliance room shall be annunciated on its own zone.

Exception: In existing *buildings*, battery-powered or plug-in single- or multiple-station carbon monoxide alarms may be installed in central fuel-burning appliance rooms in lieu of system detectors and need not be monitored by a fire alarm system. *Approved* battery-only alarms shall comply with Section 1103.9.

Devices shall be installed within 25 feet of every fuel-burning appliance and initiate an alarm condition when activated. A single device is permitted to fulfill multiple location criteria in a single central fuel-burning appliance room.

Section 1103.9.1.1 System type carbon monoxide detectors is added as follows:

1103.9.1.1 System type carbon monoxide detectors. Carbon monoxide detectors shall transmit to the central station as a separate/distinct signal and be relayed to FMO Dispatch as such.

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 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. Existing compressed gas systems located within existing buildings shall meet all the requirements of Sections 1107.1.1 through 1107.1.4.

1107.1.1 Carbon dioxide (CO_2) systems used in beverage dispensing applications. Existing carbon dioxide (CO_2) systems used in beverage dispensing applications shall comply with Section 5307.3.

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 5307.6.

1107.1.3 Carbon dioxide (CO_2) gas enrichment systems using on-site supply tanks and/or cylinders in plant growing (husbandry) applications. Existing carbon dioxide (CO_2) gas enrichment systems using on-site supply tanks and/or cylinders in plant growing (husbandry) applications shall comply with Section 5307.4.

1107.1.4 Carbon dioxide (CO_2) gas enrichment systems using a natural gas burner in plant growing (husbandry) applications. Existing carbon dioxide (CO_2) gas enrichment systems using a natural gas burner in plant growing (husbandry) applications shall comply with Section 5307.5.

SECTION 1108 Firefighter Fall Protection is added as follows:

SECTION 1108
FIREFIGHTER FALL PROTECTION

1108.1 Firefighter fall protection. All existing buildings are required to meet the following 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.

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. 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: Existing *One- and two-family dwellings* and *townhouses* constructed in accordance with the *City of Englewood Residential Code.*

CHAPTER 12
ENERGY SYSTEMS

SECTION 1203
EMERGENCY AND STANDBY POWER SYSTEMS

Section 1203.1.1 Stationary generators is amended by adding the following to the end of the sentence:

"and operated by a diesel-fueled prime mover."

Section 1203.1.1.1 Optional standby generators is added as follows:

1203.1.1.1 Optional standby generators. 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 1203.1.3 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 907.2.13.8. Optional standby generators shall also be provided with a remote status panel. Panel location shall be adjacent to the fire alarm control panel when provided or in an area *approved* by the *fire code official*.

Section 1203.1.5 Load duration is replaced as follows:

1203.1.5 Load duration. 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 Chapter 57. 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 1203.1.6 Uninterruptible power source is replaced as follows:

1203.1.6 Stored energy emergency or standby power systems. Stored energy emergency and standby power systems required by this code shall be installed in accordance with Section 1207 and NFPA 111 and shall have sufficient capacity to operate under full load for 90 minutes.

Section 1203.1.10 Location is added as follows:

1203.1.10 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 Chapter 57. 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 feet 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 Chapter 57.

   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 1203.1.10.1 Outdoor locations is added as follows:

1203.1.10.1 Outdoor locations. Where generators are located outside of a building, the following provisions shall apply.

a. Generators shall be located at least 5 feet from the exterior wall of the building. A generator may be located within 5 feet of the building if the exterior wall is non-combustible and has a 2-hour fire resistance rating. The separation distance of the generator to the exterior wall shall be maintained as required by NFPA 70 and the manufacturer's recommendations. The fire resistance rated exterior wall shall extend at least 3 feet above the generator enclosure.

b. A minimum 10-foot separation shall be maintained between a generator and any transformer, or a 2-hour fire resistance rated masonry or concrete wall shall be provided between the generator and the transformer. The separation wall shall be no less than 6 feet above the highest ground elevation on either side of the wall and not less than 2 feet above the top of the generator or transformer whichever is lower. Separation distance between this equipment and the exterior wall shall comply with NFPA 70.

Section 1203.2.2 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 1203.2.3 Emergency responder radio coverage systems is replaced as follows:

1203.2.3 Emergency responder radio coverage systems. Emergency power shall be provided for emergency responder radio coverage systems in accordance with Section 510.3.

Section 1203.2.11 High-rise buildings is replaced as follows:

1203.2.11 High-rise buildings. Emergency power shall be provided for high-rise buildings as required in Section 403 of the *City of Englewood Commercial Building Code* and shall be in accordance with Section 1203.

Section 1203.2.18 Smoke control systems is replaced as follows:

1203.2.18 Smoke control systems. Standby power shall be provided for smoke control systems as required in Section 909.7.

Section 1203.2.20 Covered mall buildings is added as follows:

1203.2.20 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 1203.7 Emergency and standby (required or optional) power generator shop drawings is added as follows:

1203.7 Emergency and standby (required or optional) power generator shop drawings. Shop drawings for emergency and standby (required or optional) power generator systems shall be submitted for permit application as a deferred submittal in accordance with Section 133.5 of the *International Building Code*. Plan review and approval are required prior to issuance of a generator construction 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 O.

SECTION 1207
ELECTRICAL ENERGY STORAGE SYSTEMS

Section 1207.5.4 Fire detection is amended to add an exception as follows:

Exception: A dedicated detached on-grade structure not exceeding 1,000 square feet..

Section 1207.6.2 Spill control and neutralization and both subsections are replaced as follows:

1207.6.2 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 20
AVIATION FACILITIES

SECTION 2001
GENERAL

Section 2001.1 Scope is replaced as follows:

2001.1 Scope. Airports, heliports, helistops, and aircraft hangars shall be in accordance with this Chapter and applicable sections of Appendix S of the *City of Englewood Commercial Building Code*.

Section 2001.3 Permits is replaced as follows:

2001.3 Permits. Permits to operate aircraft-refueling vehicles, application of flammable or combustible finishes, hot work, aviation fuel dispensing facilities – maintenance and inspection, and emergency fuel shut off (EFSO) impairment fire watch shall be in accordance with Section 105.5.

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 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 Section 906~~,~~ 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:

The emergency fuel shutoff system (EFSO) is an emergency alarm and shall comply with this section and Section 908.4. Emergency fuel shutoff switches shall be of a yellow back plate with 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. Activation of the emergency alarm system shall activate a local blue strobe or beacon. Locations, performance and marking shall comply with NFPA 407 and shall be field approved prior to installation by the FMO DEN fueling inspector.

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 the 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 written procedures approved by Denver International Airport.

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 2304.3 Unattended self-service motor fuel-dispensing facilities and all subsections are replaced as follows:

2304.3 Unattended self-service motor fuel-dispensing facilities. Unattended public self-service motor fuel-dispensing facilities are prohibited.

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 inch in height on a white background.

Exception: Existing *approved* signs consisting of contrasting lettering and background.

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 controls 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 *City of Englewood Mechanical Code*, at a minimum rate of 1.5 cubic feet per minute per square foot (cfm/ft^2) [0.008 m^3/(s · m^2)] 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.

2311.4.5 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).

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 inches high on a white background. Such warning signs shall be placed so as to be unobstructed and readily discernible.

Section 2311.8.9.1 System activation - Item 1 is replaced as follows:

1. Initiation of distinct audible and visual alarm signals in the repair garage shall be in accordance with Section 916. Signage required by Section 916.9 shall state outside of the room: "**DO NOT ENTER WHEN LIGHT IS FLASHING – NONODORIZED FLAMMABLE GAS LEAK DETECTED**"

and inside of the room: "**FLASHING LIGHT MEANS NONODORIZED FLAMMABLE GAS LEAK DETECTED – EVACUATE ROOM AND BUILDING**".

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 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.

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 replaced 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 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 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 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 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 2601.2 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 obtaining a license from the City of Englewood Department of Excise and Licenses as required by the Revised Municipal Code.

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.

Section 2603.8 Fumigations restricted is added as follows:

2603.8 Fumigations restricted. Heated elemental sulfur processes creating sulfur dioxide shall be prohibited.

CHAPTER 27
SEMICONDUCTOR FABRICATION FACILITIES

SECTION 2703
GENERAL SAFETY PROVISIONS

Section 2703.12.1 Where required 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 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 908.4 shall state,

Outside the room: "**DO NOT ENTER WHEN LIGHT IS FLASHING – HAZARDOUS PRODUCTION MATERIAL SPILL DETECTED**."

Inside the room: "**FLASHING LIGHT MEANS HAZARDOUS PRODUCTION MATERIAL SPILL DETECTED – EVACUATE ROOM AND BUILDING."**

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 916 shall state,

Outside the room: "**DO NOT ENTER WHEN LIGHT IS FLASHING – HAZARDOUS PRODUCTION MATERIAL SPILL DETECTED**."

Inside the room: "**FLASHING LIGHT MEANS HAZARDOUS PRODUCTION MATERIAL SPILL DETECTED – EVACUATE ROOM AND BUILDING."**

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 Section 906 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 Section 906. shall be located so that the travel distance to the nearest unit does not exceed 75 feet (22,860 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 Section 906. 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 at the following:

1. Ovens shall be located at or above grade.

   Exception: Ovens shall be permitted in basements where at least 50 percent 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 an operational permit (greater than or equal to 400 square feet require a construction 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 m^2).
   2.2 The aggregate area of multiple tents placed side by side without a fire break clearance of 12 feet (3658 mm), not exceeding 400 square feet (37 m^2) total.
   2.3 A minimum clearance of 12 feet (3658 mm) to all structures and other tents.

Section 3103.9 Structural stability and anchorage required is amended by replacing the last sentence as follows:

Documentation of structural stability in accordance with Section 3102.7 of the *City of Englewood Commercial Building Code* shall be furnished to the *fire code official* on request.

SECTION 3107
OPERATIONAL REQUIREMENTS

Section 3107.17 Standby personnel is replaced as follows but subsections remain:

3107.17 Standby personnel. When it is essential for public safety in a tent, or membrane structure used as a place of assembly or any other use where people congregate, because of the number of persons, or the nature of the performance, exhibition, display, contest, or activity, or when potentially hazardous conditions exist, or there is a reduction in a life safety feature, or there is an impairment to a fire protection feature, the *fire code official* is authorized to require the owner, agency, or lessee to employ and compensate through Department of Public Safety channels, at a rate established by the Executive Director of the Department of Public Safety, one or more firefighters of the City of Englewood.

Section 3107.17.3 Permit required is added as follows:

3107.17.3 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 O. *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 Sections 3206.2 and 3206.4)	ALL STORAGE AREAS (See Sections 3206, 3207, and 3208) [b]			SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (See Section 3207.3)		
		Automatic fire-extinguishing system (see Section 3206.4)	Building Access (see Section 3206.6)	Smoke and heat removal (see Section 3206.8)	Maximum pile dimension [c] (feet)	Maximum permissible storage height [d] (feet)	Maximum pile volume (cubic feet)
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 = 0.02832m^3, 1 square foot = 0.0929m^2

a. When automatic sprinklers are required for reasons other than those in 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.
b. For aisles, see Section 3206.10.
c. Piles shall be separated by aisled complying with Section 3206.10.
d. 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 Chapters 51 and 57 for special limitations for aerosols and flammable and combustible liquids, respectively.
e. Section 503 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 Section 706 of the *City of Englewood Commercial Building Code* 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 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) one half 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 3206.7.5 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 3206.7.5.1 Storage above doors is added as follows:

3206.7.5.1 Storage above doors. The clear height in accordance with Section 3206.10.2 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 Section 3206.10.1, 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 Section 3203.
2. New tenant spaces in existing buildings.
3. Existing tenant spaces with new tenants.

Exception: 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.

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 percent of that required by NFPA 13 but not less .2 gpm over 2,000 square feet. Density reductions or adjustments permitted by NFPA 13 shall not apply for determination of the 70 percent minimum density.

3211.2.2 Building access. Building access from fire apparatus access roads in accordance with Section 503 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 Section 3206.7.1.

3211.2.3 Aisles. Aisles shall be provided in accordance with Section 3206.10 or NFPA 13.

3211.2.4 Portable fire extinguishers. Portable fire extinguishers shall be provided in accordance with Section 3206.11.

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 percent of that required by NFPA 13, but not less .2 gpm over 2,000 square feet. Density reductions or adjustments permitted by NFPA 13 shall not apply for determination of the 70 percent minimum density.

3211.3.2 Building access. Building access from fire apparatus access roads in accordance with Section 503 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 Section 3206.7.

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. Aisles shall be provided in accordance with Section 3206.10 or 903.3.1.

3211.3.5 Portable fire extinguishers. Portable fire extinguishers hall be provided in accordance with Section 3206.11.

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 Section 503 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 Section 3206.7.

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. Aisles shall be provided in accordance with Section 3206.10.

3211.4.5 Portable fire extinguishers. Portable fire extinguishers shall be provided in accordance with Section 3206.11.

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 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 3312
MEANS OF EGRESS

Section 3312.1 Stairways required is amended as follows:

3312.1 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 3314
STANDPIPES

Section 3314.1 Where required is replaced as follows:

3314.1 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 2.5-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 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 2.5-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 Section 912 at a location visible from the public way, accessible to fire apparatus and approved by the *fire code official*.

Section 3319 Asbestos Operations is added as follows:

SECTION 3319
ASBESTOS OPERATIONS

3319.1 General. Operations involving asbestos or asbestos-containing materials in buildings and other structures regulated by this code shall be conducted in accordance with this Section.

3319.2 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.

3319.3 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 REBUILDING AND TIRE STORAGE

SECTION 3401
GENERAL
Section 3401.3 Waste Tire Facilities/Operations is added as follows:

3401.3 Waste tire facilities or operations shall comply with Colorado Revised Statute (CRS) 30-20-1401 as administered by the Division of Fire Prevention & Control.

SECTION 3405
OUTDOOR STORAGE

Section 3405.4 Distance from lot lines and buildings is amended by deleting the section in its entirety and replacing it as follows:

3405.4 Distance from lot lines and buildings. Tire storage piles shall be located not less than 50 feet (15 240 mm) from *lot lines* and buildings where outdoor storage is in excess of 5,000 square feet (464.5 square meters).

Exceptions:

1. Tire storage piles shall be located at least 10 feet (3048 mm) from *lot lines* and *buildings* if storage is no higher than six feet (1836 mm) and storage is equal to or less than 5,000 square feet (464.5 square meters).

2. Storage heights from six feet (1836 mm) to 10 feet (3048 mm) shall be no closer to *lot lines* and *buildings* than 20 feet (6096 mm) and storage is equal to or less than 5,000 square feet (464.5 square meters).

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 conducted in accordance with this section and Chapter 53. 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 39 Processing and extraction facilities is replaced in its entirety 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, 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

3903.3 Existing operations. Existing buildings or facilities used for the growing or processing of marijuana shall comply with this chapter. Existing extraction processes where the medium of extraction or solvent is changed shall comply with this chapter.

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. Extraction processes utilizing *flammable liquefied gas* shall not be located in any building containing Group A, E, I, or R occupancies.

3903.1.2 Egress. Exit doors from extraction rooms utilizing hazardous materials shall swing in the direction of egress and be self-closing. Panic hardware shall be provided on doors in liquefied petroleum gas (LPG) extraction rooms. Where latching door hardware is provided on extraction rooms utilizing hazardous materials, panic hardware shall be provided.

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 City of Englewood 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.

Exceptions:

1. Enclosed booths constructed in accordance with Section 2404.3.3.1 through 2404.3.3.3.

2. CO_2 extraction rooms and extraction rooms containing processes not utilizing hazardous materials.

3903.1.4 Openings and penetrations. Openings and penetrations into extraction rooms utilizing hazardous materials shall only be provided for egress, mechanical, electrical, or plumbing systems serving the extraction room. Penetrations into LPG extraction rooms 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 percent 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 Chapter 50, 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. LPG extraction rooms must use 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 *City of Englewood Mechanical Code*, Section 503. Capture and containment air velocity shall be provided across booths, hoods, or exhausted enclosures to capture and convey emissions to the exhaust system and shall be no less than 75 fpm.

3903.4.1 Exhaust for LPG extraction processes. A hazardous exhaust system engineered in accordance with the *City of Englewood Building Code* or this 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 capture and containment air velocity across all areas of the enclosure.

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 *City of Englewood Building Code or City of Englewood* or this 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 *City of Englewood Building Code* or this code unless a hazardous exhaust system is required by the *City of Englewood Building Code* or this code.
2. Solvent distillation units in compliance with Section 5705.4.
3. Extractions performed in accordance with City of Englewood Ordinance No. 629-14, § 1, 11-10-14

3903.5 Gas Detection. A continuous gas detection system complying with Section 916 shall be provided within rooms, booths or hoods, containing CO_2 or LPG extraction processes. Actuation of the gas detection system shall initiate a local alarm within the room. CO2 gas detection systems shall alarm at 5000ppm. LPG gas detection systems shall alarm at no greater than 25 percent 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 CO_2 Extraction Equipment Process discharge. CO_2 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 *City of Englewood Building Code* or this code.

3903.8 Stand-by power systems. For new or modified hazardous exhaust systems, a stand-by power system complying with Chapter 12, shall be provided for the following items, when installed:

1. Extraction room lighting
2. Extraction room ventilation system
3. Solvent gas detection system

Exception: Stand-by power shall not be required where it can be shown by engineering analysis that the hazardous process conducted will not create hazardous conditions when normal power is lost.

Section 3904 Marijuana growing operations is added as follows:

SECTION 3904
MARIJUANA GROWING OPERATIONS

3904.1 CO_2 Enrichment Systems. CO_2 enrichment systems shall comply with Section 5307.4 or 5307.5 as applicable.

3904.2 Vertical growing systems. Vertical growing systems, racks, and shelves where the top of the plants or lighting is greater than 12 feet in height shall be in accordance with Chapter 32 as a commodity classification.

The amount of plastic utilized in grow containers and irrigation components shall be accounted for in the commodity analysis for determining the hazard classification.

Chapter 40 Storage of distilled spirits and wines is deleted in its entirety and replaced as follows:

CHAPTER 40
ALCOHOL BEVERAGE PRODUCTION FACILITIES

SECTION 4001
GENERAL

4001.1 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 this code.

Unless otherwise noted, where provisions in this chapter conflict with provisions in other sections of the *City of Englewood Building Code* and this code for ABPFs, the provisions of this chapter shall supersede the provisions in those sections.

4001.2 Referenced standards. The fire code official is authorized to enforce applicable provisions of the standards listed in Chapter 80 of the *City of Englewood Fire Code* to ensure the safe operation of ABPFs. Table 4001.2 lists the standards most often utilized for ABPFs.

TABLE 4001.2

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	Standard System for Identification of Hazards of Materials for Emergency Response
NFPA 780	Standard for the Installation of Lightning Protection Systems

4001.3 Recommended practices. The *fire code official* and *building official* shall have the authority to utilize the recommended practices and data sheet listed in Table 4001.3 to render interpretations and develop policies and procedures in the application of the provisions of the *City of Englewood Building Code and City of*

Englewood Fire Code and referenced standards. Such interpretations, policies, and procedures shall be in compliance with the intent and objective of this chapter.

TABLE 4001.3

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
FM Global Property Loss Prevention Data Sheet 7-29	Ignitable Liquid Storage in Portable Containers
The Distilled Spirits Council of the United States, Inc.	Recommended Fire Protection Practices for Distilled Spirits Beverage Facilities

4001.4 Construction Documents. Construction documents shall be submitted for review and permit prior to the installation, construction, or modification of ABPFs or the operational and storage equipment therein.

4001.5 Operational Permits. Operational permits shall be required as set forth in Section 105.

SECTION 4002
DEFINITIONS, ACRONYMS AND ABBREVIATIONS

4002.1 Definitions. The following terms are defined in Chapter 2.

ALCOHOL BEVERAGE

ALCOHOL BEVERAGE PRODUCTION FACILITY (*ABPF)*

ALCOHOL BY VOLUME (*ABV*)

BEVERAGE SPIRIT

BREWERY

BULK STORAGE FOR DISTILLING

CASK

CLASS 1 LIQUIDS

CONTAINER

CITY OF ENGLEWOOD BUILDING CODE

DISTILLATION

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 (c.f., NFPA 13)

SPIRIT

STATIONARY TANK

STILL

STORAGE AREA

TANK

USE AREA

VAT (ALSO FOUDRE)

VESSEL

WASH (ALSO BEER, MALT LIQUOR)

WINE

WINERY

WORT

4002.2 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.

FMO. Fire Marshal's Office

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 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 4003
GENERAL REQUIREMENTS

4003.1 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 without hazards regulated by the *City of Englewood Building Code* and this 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 without hazards regulated by the *City of Englewood Building Code* and this 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 without hazards regulated by the *City of Englewood Building Code* and this code, shall be classified as Flammable 1B liquids.

4003.2 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 4003.2.1 through 4003.2.3. Quantities of *ethanol mixtures* exceeding the MAQs but packaged in individual, closed and unpressurized containers not exceeding 1.3 gallons (5 L) in volume shall not be counted towards the MAQs.

4003.2.1 H-2 occupancy classification. An H-2 occupancy classification shall be assigned to buildings or portions thereof in accordance with Sections 4003.2.1.1 and 4003.2.1.2.

4003.2.1.1 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 Chapter 22. The *fire code official* is 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.

4003.2.1.2 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 in 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.

4003.2.2 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 in systems pressurized to 15 pounds per square inch gauge (psig; 103.4 kPa) or less, shall be classified as H-3 occupancies.

4003.2.3 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 *City of Englewood Building* according to the fire safety and relative hazard involved.

4003.3 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.

4003.3.1 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 in accordance with Section 5001.5.2, Appendix H102 and FMO policy.

4003.3.2 Hazardous materials management plan (HMMP). An HMMP in accordance with Section 5001.5.1 and FMO policy shall be provided in an *approved* format.

4003.3.3 Process description. A process description shall be provided in an *approved* format. All relevant process and storage operations in all *control areas* and Group H Occupancies shall be identified. The quantities of all materials with regulated hazards in each area at each step of all processes shall be calculated. The maximum capacity of all *Class 1 Liquid bulk storage vessels for distilling, processing vessels* and *stills* shall be used in the quantity calculation. The capacities of all such *vessels* and *stills* that can be used simultaneously shall be counted as being simultaneously full.

4003.3.4 Emergency Planning. Fire safety and evacuation plans in accordance with Section 404 shall be prepared and maintained.

4003.3.5 Storage plan. Aisle and storage plans shall be submitted in accordance with Chapters 32 and 50.

4003.3.6 Material safety data sheets. MSDS shall be readily available on the premises for *HazMat* therein and made available to FMO inspectors upon request.

4003.3.7 Unauthorized Discharges Preparation. Plans and provisions shall be made for controlling and mitigating unauthorized discharges.

4003.3.8 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.

4003.3.9 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.

4003.4 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 4003.4.1 and 4003.4.2.

4003.4.1 Records. Accurate records shall be kept of all unauthorized discharges of *Class 1 Liquids* by the permittee.

4003.4.2 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.

4003.5 Construction. The construction of ABPFs shall be in accordance with Sections 4003.5.1 and 4003.5.2.

4003.5.1 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 *City of Englewood Building Code* and this code for the assigned occupancy classifications and this Chapter.

4003.5.2 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.

4003.6 Systems, features, and components. Systems, features, and components shall be provided in accordance with Sections 4003.6.1 through 4003.6.13.

4003.6.1 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. Accumulation of *combustible dust* on all exposed surfaces at all levels throughout the building is prohibited.

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. This shall be confirmed by sampling the actual vapor concentration under normal operating conditions. The sampling shall be conducted throughout the enclosed storage area, extending to or toward the bottom and the top of the enclosed storage area. The vapor concentration used to determine the required ventilation rate shall be the highest measured concentration during the sampling procedure. The sampling shall be conducted manually or by installation of a continuously monitoring flammable vapor detection system.

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 *City of Englewood 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 *City of Englewood Mechanical Code*.

4003.6.1.1 System requirements. Exhaust ventilation systems shall comply with all of the following:

1. Installation shall be in accordance with the *City of Englewood 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/ft^2; 0.00508 cms/m^2) 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 Chapter 4 of the *City of Englewood Mechanical Code*. 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/ft^2; 0.000305 cms/m^2).

4. Systems shall operate continuously.

   Exception: An approved engineered design alternative.

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 *combustible dust*.
7. Exhaust air shall not be recirculated to occupied areas.

4003.6.2 Spill control and secondary containment. Spill control and secondary containment shall be provided in accordance with Sections 4003.6.2.1 through 4003.6.2.2.

4003.6.2.1 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 *vessel* or system holding *Class 1 Liquids* exceeds 55 gallons (208 L);

2. The aggregate capacity of multiple *vessels* or systems holding *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.

4003.6.2.1.1 Design. The drainage system shall be in accordance with the *City of Englewood 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 code official* , 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 1 Liquids* for distilling are permitted to be exposed earth. Combustible materials such as tilled organic matter are permitted to be mixed with dirt provided the mixture is noncombustible.

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 ¼-inch (6.5mm). The sprinkler coverage area used to calculate the required volumetric flow is permitted to be based on the smaller of the following:

   1. The remote area in accordance with NFPA 13 – provided it is located in the area served by the drains

   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 1 Liquids* and water discharged from the automatic sprinkler system from flowing to adjoining areas. Floor slope shall not be less than 2 percent.

   Exceptions:

1. Floors in existing buildings with less than 2 percent 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 Section 4003.6.1.1, Item 2.

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 percent. Where a combination of impermeable curbs and trench drains is used, no less than 50 percent 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 Section 4003.6.1.1, Item 2 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.

4003.6.2.2 Outdoor. Secondary containment for outdoor storage areas shall be in accordance with Chapter 57.

4003.6.3 Occupant and property protection. Occupant and property protection shall be provided in accordance with Sections 4003.6.3.1 through 4003.6.3.4.

4003.6.3.1 Automatic sprinklers. An automatic sprinkler system shall be installed throughout ABPF H-2 and H-3 fire areas in accordance with Sections 4003.6.3.1.1 through 4003.6.3.1.3.

4003.6.3.1.1 Flammable liquids. Sprinkler discharge criteria in areas of ABPFs or portions thereof, with bulk storage (for distilling) of *Class 1 Liquids* in combustible containers, including casks, classified as H-2 or H-3, shall be in accordance with NFPA 30 but shall not be less than that required in accordance with NFPA 13 for Extra Hazard occupancies.

Exception: Sprinkler discharge criteria established by an *approved* engineered design.

Sprinkler discharge criteria for all *Class 1 Liquid use are*as and *storage areas* other than *Class 1 Liquid bulk storag*e (for distilling) in ABPFs or portions thereof classified as H-2 or H-3 occupancies, shall be in accordance with NFPA 30 but shall not be less than that required by NFPA 13 for Ordinary Hazard Group 2 over a minimum design area of 3,000 square feet (279 m2).

4003.6.3.1.2 Combustible dust producing operations. Automatic sprinkler protection criteria for H-2/*Combustible Dust* Producing Operations shall be determined in accordance with Section 4003.2.1.1.

4003.6.3.1.3 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.

4003.6.3.2 Sprinkler system supervision and alarms. Automatic sprinkler systems shall be electrically supervised in accordance with Section 903.4. Audible and visible occupant notification upon activation of water flow shall be provided in accordance with Section 907.5throughout all areas in ABPFs with automatic sprinkler protection.

4003.6.3.3 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 4003.6.3.3.1 through 4003.6.3.3.3 shall be provided in H-2 and H-3 occupancies in ABPFs.

4003.6.3.3.1 Initiation. Manual fire alarm boxes shall be installed in accordance with 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 and adjacent to each interior *exit, exit access,* or *exit discharge* door.

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.

4003.6.3.3.2 Notification. Emergency alarm audible and visible occupant notification shall be provided in accordance with Section 907 throughout *fire areas* containing H-2 or H-3 occupancies.

4003.6.3.3.3 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 this 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.

4003.6.3.4 Portable fire extinguishers. A minimum of one *approved* portable fire extinguisher complying with Section 906 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 or *use area* or *combustible dust* production area.

4003.6.4 Electrical. Electrical wiring, equipment and systems shall be installed and maintained in ABPFs in accordance with NFPA 70 (NEC), Section 605 and Sections 4003.6.4.1 through 4003.6.4.4.

4003.6.4.1 Classified electrical equipment. Classified electrical equipment per NFPA 70 (NEC) shall be installed in accordance with Section 5703.1.1. in areas of ABPFs or portions thereof, where 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.

4003.6.4.1.1 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).

4003.6.4.1.2 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).

4003.6.4.1.3 Other applications. The *fire code official* is authorized to determine the extent of the Class 1 electrical equipment and wiring locations when a condition is not specifically covered by this chapter, Section 5703.1.1 or NFPA 70 (NEC).

4003.6.4.1.4 Industrial trucks. Powered industrial trucks used in areas designated as classified electrical locations in accordance with Section 4003.6.4.1 shall be listed and labeled for use in the intended environment in accordance with NFPA 505.

4003.6.4.2 Grounding. Equipment used for grain or *Class 1 Liquids* shall be electrically connected in accordance with NFPA 70 (NEC) and NFPA 77, and Sections 4003.6.4.2.1 and 4003.6.4.2.2 to prevent the accumulation of static electricity and sparking.

4003.6.4.2.1 Conveyance equipment. All conveyance equipment including that used for grain or *Class 1 Liquid* transfer 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 and grounded; 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.

4003.6.4.2.2 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.

4003.6.4.3 Lightning protection. Lightning protection in accordance with NFPA 780 and NFPA 70 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 1 Liquids* of 7,800 gallons (29,526L) or greater (for distilling).

4003.6.4.4 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 Section 604.1.

Exception: Standby power for mechanical ventilation and limit control systems shall not be required where an *approved* fail-safe engineered system is installed.

4003.6.5 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 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 4003.6.3.1, the fire code official is authorized to reduce the minimum separation distances to not less than 1 foot (305 mm), or the minimum separation distance required by other provisions of the *City of Englewood Building Code* or this 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 4003.6.3.1, the minimum separation distance to lot lines is permitted to be 1 foot (305 mm), or the minimum separation distance required by other provisions of the *City of Englewood Building Code* or this code, whichever is greater.

4003.6.6 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*.

4003.6.7 Protection from vehicles. Bollards in accordance with 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.

4003.6.8 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*, *Class 1 Liquid use areas*, *combustible dust* production areas, and at the entrances thereto in accordance with applicable federal, state, and standards regulations, Sections 4003.6.8.1 through 4003.6.8.6, Chapters 50 and 57 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.

4003.6.8.1 Warning signs. Warning signs shall be of a durable material, have a yellow background with black text, 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.

4003.6.8.2 Information signs. Information signs shall be of a durable material, have a blue background with white text, 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.

4003.6.8.3 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. Placards shall also be located on access or exit discharge doors in the exterior walls surrounding the H-2 or H-3 occupancies.

4003.6.8.4 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.

4003.6.8.5 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.

4003.6.8.6 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 4003.6.8 corresponding to the material therein.

Exception: *Vats*.

4003.6.9 Sources of ignition. Control of sources of ignition shall be in accordance with Sections 4003.6.8.1 and 4003.6.8.2.

4003.6.9.1 Smoking. Smoking areas shall be in accordance with 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 Sections 310.3 shall be provided in such areas and at all entrances to them.

Exception: Where designated smoking areas within ABPFs are permitted, they shall be separated from *Class 1 Liquid storage areas*, *Class 1 Liquid 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 4003.6.8.

4003.6.9.2 Open flames. Open flames including barrel charring operations, and devices operating at temperatures above 680º F are prohibited throughout *fire areas* containing *Class 1 Liquid storage areas*, *Class 1 Liquid use area*s, or *combustible dust* production areas.

Exceptions:

1. Areas permitted as designated smoking.
2. Areas where hot work permits have been issued in accordance with Section 105.
3. Listed and labeled gas fired or electric unit heaters installed in accordance with the *City of Englewood Mechanical Code*, *City of Englewood Fuel Gas Code, and NFPA 70 (NEC).* Such equipment shall be 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*.
4.

4003.6.10 Separation of incompatible materials. Incompatible materials shall be separated in accordance with Section 5003.9.8.

4003.6.11 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

4003.6.12 Protection from corrosion. Machinery, piping, tank, process vessel, and container materials exposed to *Class 1 Liquids* shall be protected in accordance with Sections 4003.6.12.1 and 4003.6.12.2.

4003.6.12.1 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.

4003.6.12.2 Chemical protection. Machinery, piping, tank, *process vessel*, and container materials used for *Class 1 Liquids* shall be compatible with 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 4004.1.2.6.

4003.6.13 Limit controls. Limit controls shall be provided in accordance with Sections 4003.6.13.1 through 4003.6.13.3.

4003.6.13.1 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.

4003.6.13.2 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 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.

4003.6.13.3 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.

4003.6.14 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 Sections 5003.10.2 and 5003.10.3.

SECTION 4004
EQUIPMENT

4004.1 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 4004.1.1 through 4004.1.4.4.2.

4004.1.1 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 4004.1.1.1 through 4004.1. 1.7, Section 5703.6, and ASME B31. The use of other standards is permitted when *approved*.

4004.1.1.1 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 provided with overpressure relief devices.

4004.1.1.2 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 *Class 1 Liquids* away from the piping support system; or

2. Providing protection with a fire-resistance rating of not less than 2 hours; or

3. Other *approved* methods.

4004.1.1.3 Pipe joints. Pipe joints shall be in accordance with 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.

4004.1.1.4 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 Section 4003.6.8 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.

4004.1.1.5 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 Section 707 of the *City of Englewood Commercial Building Code*.

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.

4004.1.1.6 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.

4004.1.1.7 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.

4004.1.2 Vessels. The design and construction of *vessels* used in ABPFs for *Class 1 Liquids* shall comply with the applicable Sections 4004.1.2.1 through 4004.1.2.13.4 and NFPA 30 or shall be of an *approved* type. Pressure vessels shall comply with the *ASME Boiler and Pressure Vessel Code.*

4004.1.2.1 Underground storage of Class 1 Liquids. Underground storage of *Class 1 Liquids* in *tanks* shall comply with Chapters 50 and 57. Vaults shall be in accordance with Chapter 57. Underground storage of *Class 1 Liquids* in other *vessels* is prohibited.

4004.1.2.2 Outdoor storage of Class 1 Liquids. Outdoor storage shall be in accordance with Chapters 50 and 57.

4004.1.2.3 Tank vehicles and tank cars. Tank vehicles and tank cars shall not be used as storage or *processing vessels.*

4004.1.2.4 Design of supports. The supporting structure for *stationary tanks* and *portable tanks* with capacity greater than 660 gallons (2498 L) shall be designed in accordance with the *City of Englewood Commercial Building Code* and NFPA 30.

4004.1.2.5 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.

4004.1.2.6 Tank lining. Steel *stationary tanks* and steel *portable tanks* with capacity greater than 660 gallons (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.

4004.1.2.7 Manual drainage. Manual drainage control valves shall be provided on *stationary tanks* and *portable tanks* with capacity greater than 660 gallons (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.

4004.1.2.8 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.

4004.1.2.9 Materials used in tank construction. The materials used in tank construction shall be in accordance with NFPA 30.

4004.1.2.10 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 feet (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.

4004.1.2.11 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 Section 5704.2.14.

4004.1.2.12 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 4004.1.2.12.1 through 4004.1.2.12.5 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*.

4004.1.2.12.1 Installation of vent piping. Vent pipes shall be designed, sized, constructed, and installed in accordance with Sections 5703.6, 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.

4004.1.2.12.2 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 Section 5704.2.7.3.2.

4004.1.2.12.3 Vent pipe outlets. To facilitate atmospheric dispersion, vent outlets shall be located so *flammable 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.

4004.1.2.12.4 Manifolding. 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.

4004.1.2.12.5 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, Section 22.7.

4004.1.2.13 Vessel openings other than vents. *Vessel* openings other than vents shall comply with Sections 4004.1.2.13.1 through 4004.1.2.13.4

4004.1.2.13.1 Filling and emptying connections. Filling and emptying connections to *stationary tanks* shall be properly identified in accordance with Section 4003.6.8.

4004.1.2.13.2 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.

4004.1.2.13.3 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.

4004.1.2.13.4 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.

4004.1.3 Stairs, platforms, and walkways. Stairs, platforms, and walkways installed to facilitate access to *vessels*, storage, pipes, and process equipment shall be noncombustible and designed and constructed in accordance with NFPA 30 and the *City of Englewood Commercial Building Code*.

4004.1.4 Testing. Equipment, devices, and systems shall be tested in accordance with Sections 4004.1.4.1 through 4004.1.4.4.2.

4004.1.4.1 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.

4004.1.4.1.1 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.

4004.1.4.2 Tanks. Prior to being placed into service, *tanks* shall be tested in accordance with NFPA 30, Section 21.5.

4004.1.4.3 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.

4004.1.4.4 Periodic testing. Equipment and safety systems shall be periodically tested in accordance with Sections 4004.1.4.4.1 and 4004.1.4.4.2. 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.
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 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 Sections 5003.2.9.1 and 5003.2.9.2.

4004.1.4.4.1 Equipment. The following equipment shall be tested periodically:

1. Piping

2. Limit controls required by Section 4003.6.13

4004.1.4.4.1.1 Testing frequency. The equipment listed in Section 4004.1.4.4.1 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.

4004.1.4.4.2 Safety systems. Safety systems listed in Section 4004.1.4.3 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.

4004.2 Storage and use areas. Storage and process operations shall be in accordance with Sections 4004.2.1 through 4004.2.3.3.

4004.2.1 Storage areas. Storage of *Class 1 Liquids* and empty *containers* previously used to store *Class 1 liquids* shall be in accordance with Sections 4004.2.1.1 through 4004.2.1.4, Chapter 32, and NFPA 30.

Exception: Empty containers that are free from explosive vapors.

4004.2.1.1 General. Storage of *vessels* in closely packed *piles*, on pallets, in racks, or on shelves shall be in accordance with Sections 4004.2.1.1.1 through 4004.2.1.1.3.

4004.2.1.1.1 Basement storage. *Class 1 Liquids* shall be allowed to be stored in basements in amounts not exceeding the maximum allowable quantity per control area for "use-open" systems in Table 5003.1.1(1), provided that automatic suppression and other fire protection are provided in accordance with Chapter 9. Class II and IIIA liquids shall also be allowed to be stored in basements, provided that automatic suppression and other fire protection are provided in accordance with Chapter 9.

4004.2.1.1.2 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.

4004.2.1.1.3 Shelf storage. Shelving shall be of substantial construction and shall be braced and anchored in accordance with the seismic design requirements of the *City of Englewood Commercial Building Code* for the seismic zone in which the ABPF is located. Shelving, chocks, scuffboards, 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.

4004.2.1.1.4 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, 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.

4004.2.1.1.5 Material handling equipment. Material handling equipment shall be suitable to manipulate *vessels* at the highest tier level.

4004.2.1.1.6 Housekeeping. Storage shall be maintained in an orderly manner.

4004.2.1.1.7 Dunnage, scuffboards, floor overlay. Dunnage, scuffboards, floor overlay and similar installations shall be of noncombustible construction or of wood not less than a 1-inch (25 mm) nominal thickness.

4004.2.1.1.8 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 Chapter 32 are in conflict with those in Section 4004.2.1, the more restrictive shall govern.

4004.2.1.1.9 Bulk beverage storage areas. There shall be no storage of combustible materials in the bulk beverage storage areas not related to beverage storage activities.

4004.2.1.1.10 Empty containers and tanks. Empty *containers* and *tanks* previously used for the storage of hazardous materials shall be free from residual material and vapor as defined by DOTn, the Resource Conservation and Recovery Act (RCRA) or other regulating authority or maintained as specified for the storage of hazardous material.

4004.2.1.2 Pile storage. *Pile* storage including palletized storage shall be in accordance with Sections 4004.2.1.3.1 through 4004.2.1.3.2.2.

4004.2.1.2.1 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 interior storage configurations are stable against overturning in accordance with the seismic design requirements of the *City of Englewood Commercial Building Code* for the seismic zone in which the ABPF is located.

4004.2.1.2.2 Palletized storage. Palletized storage shall be in accordance with Sections 4004.2.1.3.2.1 and 4004.2.1.3.2.2.

4004.2.1.3.2.1 Stabilizing and supports. *Tiers of casks* oriented 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 *City of Englewood Commercial Building Code* for the seismic zone in which the ABPF is located for storage configurations other than permitted in Exceptions 1 and 2.

4004.2.1.2.2.2 Idle combustible pallets. Storage of idle wood pallets shall be limited to a maximum pile size of 2,500 square feet (232 m^2) and a maximum storage height of 6 feet (1829 mm). Storage of idle plastic pallets shall be in accordance with 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 all *Class 1 Liquid* storage by a minimum of 8 feet (2438 mm).

4004.2.1.3 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.

4004.2.2 Grain storage. Grain storage shall be in accordance with Section 4003.2.1.1.

4004.2.3 Use areas. *Use areas* for *Class 1 Liquids* in amounts exceeding the MAQ shall be in accordance with Sections 4004.2.3.1 through 4004.2.3.3.

4004.2.3.1 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.

4004.2.3.2 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.*

4004.2.3.3 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: *Class 1 Liquids* transferred into and from *containers* not exceeding a 5.3-gallon (20 L) capacity.

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CHAPTER 50
HAZARDOUS MATERIALS—GENERAL PROVISIONS

SECTION 5001

GENERAL

Section 5001.1 Scope is amended by replacing Exception 10 and 15, deleting exception 16, and adding exceptions 18 and 19 as follows:

10. The manufacture, storage, dispensing, and use of alcoholic beverages with 16 percent or less alcohol by volume and the remaining constituents having no hazardous properties regulated by the City of Englewood Building Code or City of Englewood Fire Code.

15. The manufacture, storage, dispensing, and handling of alcoholic beverages with greater than 16 percent alcohol by volume regulated in accordance with Chapter 40.

18. The manufacture, storage, dispensing, and use of alcoholic beverages not meeting the criteria of Exception 10, shall be in accordance with Chapter 40.

19. 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 Chapters 51 through 6. 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 by adding the following definitions :

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 Safety Data Sheets is replaced as follows:

5003.4 Safety Data Sheets. Hard copy Safety Data Sheets (SDS) shall be readily available on the premises for hazardous materials regulated by this chapter. Safety Data Sheets shall be located at the main entrance or a location *approved* by the *fire code official*. When a hazardous substance is developed in a laboratory, available information shall be documented and maintained at an *approved* location.

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 Section 908.4. Signage required by Section 908.4 shall state outside of the room: "**DO NOT ENTER WHEN LIGHT IS FLASHING – HAZMAT SPILL EMERGENCY ALARM ACTIVATED**", and inside of the room: "FLASHING LIGHT MEANS HAZMAT SPILL EMERGENCY ALARM ACTIVATED – EVACUATE ROOM AND BUILDING."

Section 5004.10 Supervision and monitoring is replaced as follows:

5004.10 Supervision and monitoring. Emergency alarm, detection, and automatic fire-extinguishing systems required by Section 5004, 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. Means & methods for determining exhaust capture requirements can be found in the "*Industrial Ventilation, A Manual of Recommended Practice*", 29th edition, published by the American Conference of Governmental Industrial Hygienists (ACGIH).

Exception: Gases, liquids or solids which can be demonstrated not to create harmful fumes, mists or vapors under the conditions in which they are handled.

CHAPTER 53
COMPRESSED GASES

SECTION 5307
COMPRESSED GASES NOT OTHERWISE REGULATED

Section 5307.2.2 Insulated liquid cryogenic fluid systems is added as follows:

5307.2.2 Insulated liquid cryogenic fluid systems. Areas containing insulated liquid cryogenic fluid systems used in commercial, manufacturing or industrial applications shall comply with Section 5307.6.

Section 5307.3 Insulated liquid carbon dioxide systems used in beverage dispensing applications and all subsections are replaced as follows:

5307.3 CO_2 Systems used in beverage dispensing applications. CO_2 systems with more than 100 pounds (45.4 kg) of CO_2 or any system using any amount of CO_2 below grade used in beverage dispensing applications shall comply with Sections 5307.3.1 through 5307.3.8.

Definitions

Asphyxiation: to lose consciousness by impairing normal breathing, to suffocate or smother.

Dewar: a vacuum flask that holds a cryogenic or liquefied gas.

CO_2 Detector: a device to measure the concentration of CO_2 in the air.

CO_2 Gas Detection Control Unit: a system component that monitors inputs and controls outputs through various types of circuits.

Indoor use of CO_2: Rooms or areas sheltered from the weather and environmental conditions.

Liquid CO_2 Systems: An assembly of equipment consisting of one or more CO_2 supply containers, interconnecting piping, pressure regulators, and pressure relief devices.

PEL: Permissible Exposure Limit for CO_2 gas is 5,000 PPM (0.5 percent) Time Weighted Average (TWA) @ 8 hours a day, 40 hours per week.

STEL: Short-Term Exposure Limit for CO_2 is 30,000 PPM (3.0 percent) for less than 15 minutes.

IDLH: Immediately Dangerous to Life & Health for CO_2 is 40,000 PPM (4.0 percent).

5307.3.1 Reserved.

5307.3.2 Equipment. The storage, use, and handling of CO_2 shall be in accordance with Chapter 53 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.

5307.3.2.1 Containers, cylinders, and tanks. Gas supply 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*. Labels identifying the hydrostatic test date of containers, cylinders, and tanks must be always visible for inspection.

5307.3.2.1.1 Location. Location of gas supply containers, cylinders, and tanks, inside or outside the building, shall be at an *approved* location.

5307.3.2.1.2 Security. Gas supply 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.

5307.3.2.1.3 Design and construction. Bulk tank installations over 2,000 pounds will require an engineered foundation and construction permit in accordance with Section 105.7.31.

5307.3.3 Piping systems. Piping, tubing, fittings, valves, and pressure regulating devices shall be designed and installed in accordance with *approved* standards and manufacturers' recommendations.

5307.3.3.1 Piping, tubing, and hoses. Piping, tubing, and hose materials shall be compatible with CO_2 and rated for the temperatures and pressures encountered in the system. All hoses and tubing used in CO_2 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 CO_2 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 CO_2 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 CO_2.

5307.3.3.2 Support. Gas piping shall not be attached or supported by any electrical light supports or wiring. All gas piping shall be supported by the building structures or other *approved* means.

5307.3.3.3 Identification. Markings for CO_2 piping systems shall consist of the content's name CO_2 and direction-of-flow arrow. Markings shall be provided at each valve; at wall, floor or ceiling penetrations; at each change of direction; and at not less than every 20 feet or fraction thereof throughout the piping run.

5307.3.3.4 Fittings, joints, and connections. Fittings, joints, and connections shall be subject to the approval of the *fire code official*.

5307.3.3.4.1 Fittings and joints between gas supply containers and automatic shutoff valve. Joints and fittings on the supply piping or tubing between the CO_2 supply source and the automatic system shutoff valve shall be threaded, compression, or welded.

5307.3.3.4.2 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.

5307.3.3.4.3 All connections. All fittings and joints shall be exposed and located adjacent to the supply source or points of use and shall be protected by a detector.

5307.3.3.5 Valves. Piping systems shall be provided with valves in accordance with Sections 5307.3.3.5.1 through 5307.3.3.5.5.

5307.3.3.5.1 Pressure relief valves. Pressure relief valves shall be provided and piped to the outdoors.

5307.3.3.5.2 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 in a closed condition. Loss of electrical power to the valve and gas detection shall close the system automatic shut off valve. Automatic shutoff valves shall be designed and located so that all phases (i.e., gas, liquid and solid) of CO_2 will not interfere with the operation of the devices. Automatic system shutoff valve shall have components that indicate the valve operating position, open or closed.

5307.3.3.5.3 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.

5307.3.3.5.4 Check valves. One-way flow check valves shall be installed at the most downstream end of copper runs that are used for beverage consumption.

5307.3.3.5.5 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.

5307.3.3.6 Venting. Venting of gases shall be directed to an *approved* location outside the building. Insulated liquid CO_2 systems shall have pressure relief devices vented in accordance with NFPA 55.

5307.3.3.6.1 Beverage pumps. Beverage pumps shall be vented to the outside.

5307.3.4 Protection from damage. CO_2 systems shall be installed so the supply tanks, cylinders, piping, fittings, and other appurtenances are protected from damage by occupants or equipment during normal facility operations.

5307.3.5 Required protection. Where CO_2 supply tanks, cylinders, piping, and equipment are located indoors, rooms, or areas containing CO_2 supply tanks, cylinders, piping, and fittings and other areas where a leak of a CO_2 system can collect shall be provided with either ventilation in accordance with Section 5307.3.5.1 or a gas detection system in accordance with Section 5307.3.5.2.

5307.3.5.1 Ventilation. Mechanical ventilation shall be in accordance with the *City of Englewood Mechanical Code* and shall comply with all 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 $m^3/(s \cdot m^2)$].
2. Exhaust shall be taken from a point within 12 inches 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 in accordance with Section 1 of the *City of Englewood Building Code*.

5307.3.5.2 Gas Detection System. A gas detection system shall comply with all the following:

1. Continuous gas detection shall be provided to monitor areas where CO_2 can accumulate. Detection equipment shall be provided to indicate CO_2 levels at each point of use and at each supply tank area/room.
2. Detectors shall comply with all the below:
    a. Listed or *approved* devices.
    b. Permanently mounted.
    c. Installed at a height of no more than 12 inches above the floor or as *approved* by the fire code official. Detectors shall have no storage or other equipment within 3 inches on all sides of the detector, and/or placed in an area that would prevent CO2 from reaching the detector
    d. Connected to building electrical system by either hardwiring (requiring a separate electrical permit) or to a non-spliced cord and plug connection that is secured in an approved manner to prevent accidental disconnection/damage or to a CO_2 gas detection system unit.
    e. Auto calibrating and self "zeroing" devices are not permitted unless they can be zeroed and spanned.
    f. Located within manufacturers' specified detection range or within 15 feet (whichever is less) for each point of use and supply location.
    g. Listed to operate under environmental conditions such as temperature, humidity, and velocity variations.
    h. Devices used must be able to be calibrated for altitude.
    i. Detectors shall be provided with an open cage type cover or other approved device to protect from damage resulting from normal operation in the area or adjacent equipment or storage.
3. Alarm set points shall be set at:
    a. 5,000 PPM (0.5 percent) Time Weighted Average (TWA) – Self re-setting (non-latching) alarm.
        - Audible notification for employees only in *approved* locations with instructional signage.
    b. 15,000 PPM (1.5 percent) – Latching Alarm.
        - Audible notification for employees only in *approved* locations with instructional signage.
        - Requires a service company or *approved* trained employees to investigate, repair and reset.
    c. 30,000 PPM (3 percent) – Latching Alarm.
        - Initiate all amber horn/strobes provided near each interior supply container, cylinder, or tank and at each point of use. Additional amber horn/strobes shall be placed at the entrances to below grade locations, confined spaces including small volume rooms, and at walk-in coolers. The notification appliances shall be rated at a minimum of 80cd for visual intensity and 75 dBA for audibility. Notification

appliances shall be mounted per NFPA 72 requirements with the entire lens mounted between 80 inches and 96 inches above finished floor. Notification appliances shall be listed to operate in special environments, such as outdoors, indoors, high or low temperatures, and high humidity.

- Activation of automatic system shutoff valve.
- Evacuate room/area and call 911.
- Provide an annunciator panel/unit that annunciates the location of the CO_2 detection zone in alarm by means of a directory LED (light-emitting diode) point display or LCD (liquid crystal display) to assist the responding firefighters. Annunciator panel/unit shall be installed in an *approved* location outside of the potentially CO_2 contaminated areas.
- Provide a graphic floor plan map of the area protected by the CO_2 gas detection system that is permanently mounted adjacent to the annunciator panel/unit or CO_2 gas detection control unit. Plans shall be of durable construction, easily readable in normal lighting, protected by a smooth, transparent, plastic surface and shall indicate the location of supply tank, points of use, and CO_2 detectors. The graphic map shall state "You Are Here" and be properly oriented to assist the responding firefighters.
- Provide a labeled and secured alarm silencing switch adjacent to the annunciator panel/unit that shall only de-activate the audible notification appliances (amber strobes shall remain on and automatic system shutoff valve shall remain closed) until the system is manually reset.
- Alarm silencing can only be performed by approved Fire Department personnel. Manual reset can only be performed by a qualified service company or by approved Fire Department personnel.
- Alarm Signal shall be defined as the following: In buildings with a monitored sprinkler or fire alarm/detection system, the CO_2 gas detection system shall be connected to the building fire alarm control panel. This shall include a monitor modules or zones for a high alarm (30,000 ppm or 3.0 percent), a LED hazmat CO_2 alarm zone on the building annunciator, a non-latching supervisory CO_2 maintenance/testing bypass switch, and modified building graphic map indicating the location of the CO_2 gas detection control unit, annunciator panel/unit, CO_2 detectors, and CO_2 supply tank. Building fire alarm notification appliances shall not activate on this CO_2 hazmat alarm. The central station monitoring shall receive and dispatch a CO_2 hazmat alarm.

4. Signage shall be required adjacent to each horn/strobe as follows:

   Outside the supply tank room or point of use area/room: ***"DO NOT ENTER WHEN LIGHT IS FLASHING – CO_2 LEAK DETECTED – EVACUATE IMMEDIATELY AND CALL 911"***

   Inside the supply tank room or point of use area/room: ***"FLASHING LIGHT MEANS CO2 LEAK DETECTED – EVACUATE IMMEDIATELY AND CALL 911"***

The sign shall have a minimum 1-inch block lettering with a minimum ¼-inch stroke. The sign shall be on a contrasting surface of black on yellow and shall be of durable construction.

NFPA 704 placards for simple asphyxiants shall also be provided at the main entrance to supply tank rooms, areas, or confined spaces.

5. CO_2 Gas Detection Control Unit shall be:
   a. Listed or *approved*.
   b. Used as the required annunciator panel/unit and silencing switch.
   c. Connected to building electrical by either hardwiring (requiring a separate electrical permit from the building department) or non-spliced cord and plug connection that is visible from control unit and is labeled and protected from accidental disconnection or damage.
   d. Labeled and installed in an *approved* location outside of the potentially CO_2 contaminated areas and shall be secured from unauthorized access. Buildings with a fire department key box can secure the control unit with a lockable cover whereas all other covers shall be secured with an *approved* breakable, recordable tie or wire. Subject to field approval. Ties and wires that have been replaced shall be recorded with the record presented to City of Englewood Fire Marshal's Office Inspection personnel upon request.

6. Wiring shall be:
   a. Wiring diagrams shall be provided for all initiating devices and notification appliances
   b. Pathway wiring, cable, and equipment shall be in accordance with 2017 NFPA 70, Article 760 and 770, as applicable
   c. Gas detection circuits shall be installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, cable ties, hangers, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with Article 300 as well as other referenced articles.
   d. Design shall account for voltage-drops for notification appliance circuits.

5307.3.6 Transfilling. Filling and transfilling of gases between storage containers, cylinders, 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. Interior supply containers, cylinders, and tanks shall be filled via a remote fill port on the exterior of the building positioned 3 feet from any pedestrian or overhead door and 3 feet above grade and 10 feet from air intakes and stairwells that go below grade. If the interior supply tank exceeds 1,000 pounds the fill connection port shall be positioned 10 feet from exits (pedestrian and overhead doors), air intakes, and 2 feet from all other openings (windows).

5307.3.7 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.

5307.3.7.1 Records. A written record of all alarm activations/resets, required inspections, testing, calibration, and maintenance shall be maintained in a logbook on the premises containing the 3 most current years of records and be available for review by Fire Department personnel.

5307.3.7.2 Required inspections and testing. All piping installations shall be tested and inspected in accordance with Sections 5307.3.7.2.1 through 5307.3.7.2.5.

5307.3.7.2.1 Acceptance testing. Devices, appliances, and related equipment shall not be placed in operation until after the piping system has been checked for leakage as well as detectors, notification appliances and automatic shutoff valves 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 percent of the operating pressure. Joints shall be checked with a bubble-forming solution. Acceptance testing is required to be witnessed by the fire code officials. Provide an inspection report to the *fire code official* for the piping and joint visual inspection and pressure test.

5307.3.7.2.2 Daily inspections. All detectors and alarms shall be visually inspected daily. These inspections are permitted to be conducted by trained employees.

5307.3.7.2.3 Monthly inspections. All storage vessels, piping, and appurtenances shall be visually inspected monthly. These inspections are permitted to be conducted by trained employees.

5307.3.7.2.4 Semi-annual inspections. Systems shall be visually inspected, gas detectors calibrated in accordance with manufacturers' specifications, alarms tested, and tested for leaks semi-annually by a qualified service company.

5307.3.7.2.5 Alterations and repair. In the event alterations, repairs, or additions are made, the affected piping shall be retested in accordance with Section 5307.3.7.2.1.

5307.3.7.3 Reserved.

5307.3.7.4 Calibration. Detectors shall be checked for accuracy, calibrated to a reference gas concentration, and span reset.

5307.3.7.5 Pressure testing. Pipe joints shall be exposed for examination during the test.

5307.3.7.5.1 Test medium. The test medium shall be air, nitrogen, CO_2, or an inert gas.

5307.3.7.5.2 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.

5307.3.7.5.3 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 5307.3.7.2.1.

5307.3.7.5.4 Test preparation. All joints and fittings shall be exposed for examination during and after the test.

5307.3.7.5.4.1 Pipe clearing. Prior to testing, the interior of the pipe shall be cleared of all foreign material.

5307.3.7.5.4.2 Appliance and equipment isolation. Devices, appliances, and equipment that are not to be included in the test shall be isolated from the piping by closing the device shutoff valve.

5307.3.7.5.4.3 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.

5307.3.7.5.4.4 Test pressure. The test pressures shall be as specified in Section 5307.3.7.2.1. 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.

5307.3.7.5.5 Test duration. The test duration shall be not less than 10 minutes.

5307.3.7.5.6 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

5307.3.7.5.7 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.

5307.3.7.5.8 Corrections. Where leakage or other defects are located, the affected portion of the piping system shall be repaired or replaced and retested.

5307.3.8 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 5307.4 Carbon dioxide enrichment systems and all subsections are replaced as follows:

5307.4. Carbon Dioxide (CO2) gas enrichment systems using on-site supply tanks and/or cylinders in plant growing (husbandry) application. CO_2 enrichment systems using on-site supply tanks and/or cylinders with more than 100 pounds (45.4 kg) of CO_2 or any system using any amount of CO_2 below grade used in plant growing (husbandry) applications shall comply with Sections 5307.4.1 through 5307.4.12.

5307.4.1 Permits. Permits shall be required in accordance with Sections 105.

5307.4.2 Equipment. The storage, use, and handling of CO_2 shall be in accordance with Chapter 53 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.

5307.4.2.1 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. Labels identifying the hydrostatic test date of containers, cylinders, and tanks must be always visible for inspection.

5307.4.2.1.1 Location. Location of gas storage containers, cylinders and tanks, inside or outside the building, shall be at an *approved* location.

5307.4.2.1.2 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.

5307.4.2.1.3 Design and construction. Bulk tank installations over 2,000 pounds will require an engineered foundation and construction permit in accordance with Section 1 of the *City of Englewood Building Code*, or other *approved* engineered solutions.

5307.4.2.2 Piping systems. Piping, tubing, fittings, valves, and pressure regulating devices shall be designed and installed in accordance with *approved* standards and manufacturers' recommendations.

5307.4.2.2.1 Piping, tubing and hoses. Piping, tubing, and hose materials shall be compatible with CO_2 and rated for the temperatures and pressures encountered in the system. All hoses and tubing used in CO_2 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 CO_2 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 CO_2.
5. Additional *approved* piping, tubing and hoses found in the Compressed Gas Association (CGA) standards for CO_2.

5307.4.2.2.2 Support. Gas piping shall not be attached or supported by any electrical light supports or wiring. All gas piping shall be supported by the building structures or other *approved* means.

53074.2.2.3 Identification. Markings for CO_2 piping systems shall consist of the content's name CO2 and direction-of-flow arrow. Markings shall be provided at each valve; at wall, floor or ceiling penetrations; at each change of direction; and at not less than every 20 feet or fraction thereof throughout the piping run.

5307.4.2.3 Fittings, joints and connections. Fittings, joints, and connections shall be subject to the approval of the *fire code official.*

5307.4.2.3.1 Fittings and joints between gas supply containers and automatic shutoff valve. Joints and fittings on the supply piping or tubing between the CO_2 supply source and the automatic system shutoff valve shall be threaded, compression or welded.

5307.4.2.3.2 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.

5307.4.2.3.3 Concealed connections. All fittings and joints shall be exposed and located adjacent to the supply source or points of use and shall be protected by a detector.

5307.4.2.4 Valves. Piping systems shall be provided with valves in accordance with Sections 5307.4.2.4.1 through 5307.4.2.4.4.

5307.4.2.4.1 Pressure relief valves. Pressure relief valves shall be provided and piped to the outdoors.

5307.4.2.4.2 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 closing on loss of electrical power to the valve and gas detection. Additional automatic shutoff valves may be provided at each point of use. Automatic shutoff valves shall be designed and located so that all phases (i.e., gas, liquid and solid) of CO_2 will not interfere with the operation of the device.

5307.4.2.4.3 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.

5307.4.2.4.4 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.

5307.4.2.5 Venting. Venting of gases shall be directed to an *approved* location outside the building. Insulated liquid CO_2 systems shall have pressure relief devices vented in accordance with NFPA 55.

5307.4.3 Protection from damage. systems shall be installed so the storage tanks, cylinders, piping and fittings are protected from damage by occupants or equipment during normal facility operations.

5307.4.4 Required protection. Where CO_2 storage tanks, cylinders, piping and equipment are located indoors, rooms or areas containing CO_2 storage tanks, cylinders, piping and fittings and grow room/areas where CO_2 is released and can collect shall be provided with a gas detection system in accordance with Section 5307.4.4.1.

5307.4.4.1 Gas detection system. A gas detection system shall comply with all of the following:

1. Continuous gas detection shall be provided to monitor areas where CO_2 can accumulate. Detection equipment shall be provided to indicate CO_2 levels in each grow cultivation area/room and interior CO_2 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.* Detectors shall have no storage or other equipment within 3 inches on all sides of the detector, and/or placed in an area that would prevent CO_2 from reaching the detector.
    d. Directly connected to building electrical supply and or fire alarm systems and secured in an approved manner to prevent 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.

g. Listed to operate under environmental conditions such as temperature, humidity, and velocity variations.

h. Devices used must be able to be calibrated for altitude. Devices used must be able to be calibrated for altitude.

3. Activation of the gas detection system shall initiate amber horn/strobes provided in the vicinity of each interior storage container, cylinder or tank and at each point of release. Additional amber horn/strobes shall be placed at the entrances to below grade locations and confined spaces. The notification appliances shall be rated a minimum of 80cd for a visible and 75 dBA for audibility. Notification appliances shall be mounted per NFPA 72 requirements with the entire lens mounted between 80 inches and 96 inches above finished floor. Notification appliances shall be listed to operate in special environments, such as outdoors, indoors, high or low temperatures, and high humidity. Provide notification appliances at the following locations:

   a. Inside an interior storage room/area and outside the room/area at each entrance.

   b. Inside grow cultivation room/areas.

4. Local alarm set points shall be set at: 5,000 PPM – Latching Alarm

   a. Visual and audible notification in *approved* locations at room or area in alarm.

   b. Activation of automatic system shut off valve.

   c. Evacuate the room in alarm and contact a qualified service company to investigate and address the condition.

   d. Reset of the emergency alarm to be conducted by qualified personnel.

5. Signage shall be required adjacent to each horn/strobe as follows.

   Storage area/room: "DO NOT ENTER WHEN LIGHT IS FLASHING - CO_2 LEAK DETECTED"

   Grow cultivation room/area dispensing: "FLASHING LIGHT MEANS CO_2 LEAK DETECTED –EVACUATE ROOM"

   The sign shall have a minimum 1-inch block lettering with a minimum 1⁄4-inch stroke. The sign shall be on a contrasting surface of black on yellow and shall be of durable construction.

   Signage on entrance doors to grow cultivation and storage rooms: 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. CO_2 Gas Detection Control Unit shall be:

   a. Listed or *approved*.

   b. Used as the required annunciator panel/unit and silencing switch.

   c. Connected to building electrical system by either hardwiring (requiring a separate electrical permit) or non-spliced cord and plug connection that is visible from control unit and is labeled and secured in an approved manner to prevent accidental disconnection or damage.

   d. Labeled and installed in an *approved* location outside of the potentially CO_2 contaminated areas and shall be secured from unauthorized access. Buildings with a fire department key box can secure the control unit with a lockable cover whereas all other covers shall be secured with an *approved* breakable, recordable tie or wire. Subject to field approval. Ties and wires that have been replaced shall be recorded with the record presented to Fire Department Inspection personnel upon request.

7. Wiring shall be:

   a. Wiring diagrams shall be provided for all initiating devices and notification appliances

   b. Pathway wiring, cable, and equipment shall be in accordance with 2017 NFPA 70, Article 760 and 770, as applicable

   c. Gas detection circuits shall be installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, cable ties, hangers, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with Article 300 as well as other referenced articles.

   d. Design shall account for voltage-drops for notification appliance circuits.

6. A minimum of one portable CO_2 meter shall be in use during business hours.

5307.4.5 Transfilling. Filling and transfilling of gases between storage containers, cylinders, 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. Interior supply containers, cylinders, and tanks shall be filled via a remote fill port on the exterior of the building positioned 3 feet from any pedestrian or overhead door and 3 feet above grade and 10 feet from air intakes and stairwells that go below grade. If the interior supply tank exceeds 1,000 pounds the fill connection port shall be positioned 10 feet from exits (pedestrian and overhead doors), air intakes, and 2 feet from all other openings (windows).

5307.4.6 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.

5307.4.7 Records. A written record of all required inspections, testing, calibration, and maintenance shall be maintained in a logbook on the premises containing the three most current years of records and be available for review by Fire Department personnel.

5307.4.8 Required inspections and testing. All piping installations shall be tested and inspected in accordance with Sections 5307.4.8.1 through 5307.4.8.5.

5307.4.8.1 Acceptance testing. Appliances and equipment shall not be placed in operation until after the piping system has been checked for leakage and detectors, notification devices and automatic shutoff valves 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 percent of the operating pressure. Joints shall be checked with a bubble-forming solution. Acceptance testing is required to be witnessed by the fire code official and/or *building official*s. Provide an inspection report to the fire code official and/or *building official* for the piping and joint visual inspection and pressure test.

5307.4.8.2 Daily inspections. All detectors and alarms shall be visibly inspected daily. These inspections are permitted to be conducted by trained employees.

5307.4.8.3 Monthly inspections. All storage vessels, piping, and appurtenances shall be visually inspected monthly. These inspections are permitted to be conducted by trained employees.

5307.4.8.4 Semi-annual inspections. Systems shall be visually inspected, gas detectors calibrated in accordance with manufacturer's specification, alarms tested, and tested for leaks semi-annually by a qualified service company.

5307.4.8.5 Alterations and repair. In the event alterations, repairs or additions are made, the affected piping shall be retested in accordance with Section 5307.4.8.1.

5307.4.9 Reserved.

5307.4.10 Calibration. Detectors shall be checked for accuracy, calibrated to a reference gas concentration, and span reset.

5307.4.11 Pressure testing. Pipe joints shall be exposed for examination during the test.

5307.4.11.1 Test medium. The test medium shall be air, nitrogen, CO_2, or an inert gas.

5307.4.11.2 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.

5307.4.11.3 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 5307.4.8.1.

5307.4.11.4 Test preparation. All joints and fittings shall be exposed for examination during and after the test.

5307.4.11.4.1 Pipe clearing. Prior to testing, the interior of the pipe shall be cleared of all foreign material.

5307.4.11.4.2 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.

5307.4.11.4.3 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.

5307.4.11.4.4 Test pressure. The test pressures shall be as specified in Section 5307.6.6.5. 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.

5307.4.11.5 Test duration. The test duration shall be not less than 10 minutes.

5307.4.11.6 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.

5307.4.11.7 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.

5307.4.11.8 Corrections. Where leakage or other defects are located, the affected portion of the piping system shall be repaired or replaced and retested.

5307.4.12 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 5307.5 Carbon Dioxide (CO2) Gas Enrichment Systems Using a Natural Gas Burner in Plant Growing (Husbandry) Applications is added as follows:

5307.5 Carbon Dioxide (CO_2) Gas Enrichment Systems Using a Natural Gas Burner in Plant Growing (Husbandry) Applications. Natural gas burners that are utilized to generate CO_2 in plant growing applications shall comply with Sections 5307.5.1 through 5307.5.6.

5307.5.1 Permits. Permits shall be required in accordance with Section105.

5307.5.2 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.

5307.5.3 Required protection. Where natural gas burners are located indoors for CO_2 enrichment, grow room/areas shall be provided with a gas detection system in accordance with Section 5307.5.3.1 and carbon monoxide detection in accordance with Section 5307.5.3.2.

5307.5.3.1 Gas detection system. A gas detection system shall comply with all the following:

1. Continuous gas detection shall be provided to monitor areas where CO_2 can accumulate. Detection equipment shall be provided to indicate CO_2 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.* Detectors shall have no storage or other equipment within 3 inches on all sides of the detector, and/or placed in an area that would prevent CO2 from reaching the detector.
   d. Directly connected to building electrical supply and/or fire alarm systems and secured in an approved manner to prevent 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.
   g. Listed to operate under environmental conditions such as temperature, humidity, and velocity variations.
   h. Devices used must be able to be calibrated for altitude.
3. Activation of the emergency alarm system shall initiate amber strobes/horns provided in each room/area where CO_2 can accumulate. Additional amber strobes and audible horns shall be placed at the entrances to below grade locations. The notification appliance shall be rated a minimum of 80cd for a visible and 75 dBA for audibility. Notification appliances shall be mounted per NFPA 72 requirements with the entire lens mounted between 80 inches and 96 inches above finished floor. Notification appliances shall be listed to operate in special environments, such as outdoors, indoors, high or low temperatures, and high humidity. Provide notification appliances at the following locations:
   a. Inside grow cultivation room/areas.
4. Local alarm set points shall be set at: 5,000 PPM – Latching Alarm
   a. Visual and audible notification in *approved* locations at room or area in alarm.
   b. Activation of the automatic natural gas control valves to each burner to a closed position stopping the generation of CO_2.
   c. Evacuate the room in alarm and contact a qualified service company to investigate and address the condition.
   d. Reset of emergency alarm to be conducted by qualified personnel.
5. Signage will be required adjacent to each horn/strobe as follows:

Entrance to below grade location: “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 1-inch block lettering with a minimum ¼-inch stroke. The sign shall be on a contrasting surface of black on yellow and shall be of durable construction.

Signage at entrance doors 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 CO2 burner systems shall shut down in the event of a loss of electrical power to the CO2 detectors.
7. A minimum of one portable CO_2 meter shall be in use during business hours.

5307.5.3.2 Carbon monoxide (CO) gas detection.

1. 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 at set at 35 PPM and upon activation shall initiate the following:
   ● Close the automatic valve to each burner.
   ● Activate the mechanical ventilation system.
4. All CO2 burner systems shall shut down in the event of a loss of electrical power to the carbon monoxide detector.

5. A minimum of one portable CO meter shall be in use during business hours.

5307.5.4 Inspection and testing. All detectors, alarms and CO_2 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.

5307.5.4.1 Records. A written record of all required inspections, testing, calibration, and maintenance shall be maintained in a logbook on the premises containing the three most current years of records and be available for review by Fire Department personnel.

5307.5.4.2 Required inspections and testing. All detectors, alarms and CO_2 burner equipment shall be tested and inspected in accordance with Sections 5307.5.4.2.1 through 5307.5.4.2.6.

5307.5.4.2.1 Acceptance testing. Appliances and equipment shall not be placed in operation until after the detectors, notification appliances automatic gas control valves, and mechanical ventilation system have been tested by a qualified service company. Acceptance testing is required to be witnessed by *fire code official*s.

5307.5.4.2.2 Daily inspections. All detectors and alarms shall be visually inspected daily. These inspections are permitted to be conducted by trained employees.

5307.5.4.2.3 Monthly inspections. All CO_2 burners and appurtenances shall be visually inspected monthly. These inspections are permitted to be conducted by trained employees.

5307.5.4.2.4 Semi-annual inspections. Systems shall be visually inspected, and gas detectors calibrated in accordance with manufacturer specification semi-annually by a qualified service company.

5307.5.4.2.5 Annual testing. All detectors, alarms, gas control valves and mechanical ventilation systems shall be tested annually by a qualified service company.

5307.5.4.2.6 Alterations and repair. In the event alterations, repairs or additions are made, the affected equipment shall be retested in accordance with Section 5307.5.4.2.1

5307.5.4.3 Reserved

5307.5.4.4. Calibration. Detectors shall be checked for accuracy, calibrated to a reference gas concentration, and span reset.

5307.5.5 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.

5307.5.6 Mechanical Ventilation. A mechanical ventilation system shall be provided in accordance with the *City of Englewood Mechanical Code* that complies with all the following:

1. Mechanical ventilation system shall be provided in enriched spaces capable of producing a ventilation airflow rate of 0.75 cfm per square foot (0.0038 m3/s • m2) of floor area.
2. The ventilation system shall discharge to the outdoors.
3. When active, the ventilation system shall operate at a negative pressure to adjacent indoor spaces.

Section 5307.6 Inert Gas Systems Used in Commercial, Manufacturing or Industrial Applications is added as follows:

5307.6 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 breweries, water treatment with pH balancing, food processing or laboratories shall comply with Sections 5307.6.1 through 5307.6.7. Inert gases include but are not limited to argon, helium, nitrogen and carbon dioxide. Provisions of Section 5307.3 are applicable where CO_2 is used.

Exceptions:

1. Medical gas systems
2. Gaseous Fire suppression systems
3. Carbon dioxide gas enrichment systems in accordance with Section 5307.4

5307.6.1 Permits. Permits shall be required in accordance with Sections 105.

5307.6.2 Equipment. The storage, use, and handling of inert gases shall be in accordance with Chapters 53 and 55, and the applicable requirements of NFPA 55. All equipment utilized in compressed gas systems shall be compatible with the intended gas and use.

5307.6.2.1 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. Labels identifying the hydrostatic test date of containers, cylinders, and tanks must be always visible for inspection.

5307.6.2.1.1 Location. Location of gas storage containers, cylinders and tanks, inside or outside the building, shall be at an *approved* location.

5307.6.2.1.2 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.

5307.6.2.1.3 Design and construction. Bulk tank installations over 2,000 pounds will require an engineered foundation and construction permit in accordance with Section 130.3 of the *Administration of the City of Englewood Building Code or other approved engineered solutions.*

5307.6.2.2 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. Piping systems shall be marked in accordance with Chapter 53. 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 closing on loss of electrical power to the valve and gas detection. All valves shall be designed or marked to indicate clearly whether it is open or closed. All fittings and joints shall be exposed and located adjacent to the supply source or points of use and shall be protected by a detector.

5307.6.2.3 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.

5307.6.3 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.

5307.6.4 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 ventilation in accordance with Section 5307.6.4.1 and a gas detection system in accordance with Section 5307.6.4.2.

5307.6.4.1 Ventilation. Mechanical ventilation installations shall be in accordance with the *City of Englewood 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 $m^3/(s \cdot m^2)$].
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 percent oxygen in the room.
5. A mechanical permit is required in accordance with Section 130.3 of the *Administration of the City of Englewood Building Code.*

5307.6.4.2 Gas detection system. A gas detection 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. Detectors shall have no storage or other equipment within 3 inches on all sides of the detector, and/or placed in an area that would prevent the air/gas mixture from reaching the detector.
    d. Directly connected to the building electrical supply and fire alarm system and secured in an approved manner to prevent 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.

g. Listed to operate under environmental conditions such as temperature, humidity, and velocity variations.

h. Devices used must be able to be calibrated for altitude.

3. Activation of the gas detection system shall initiate amber horn/strobes provided in the vicinity of each interior storage container, cylinder or tank and at each point of release. Additional amber horn/strobes shall be placed at the entrances to below grade locations and confined spaces. The notification appliances shall be rated a minimum of 80cd for a visible and 75 dBA for audibility. Notification appliances shall be mounted per NFPA 72 requirements with the entire lens mounted between 80 inches and 96 inches above finished floor. Notification appliances shall be listed to operate in special environments, such as outdoors, indoors, high or low temperatures, and high humidity. Provide notification appliances at the following locations:

1.1 Inside an interior storage room/area and outside the room/area at each entrance.

4. Alarm set points shall be set at:

a. Oxygen levels below 19.5 percent – Self re-setting (non-latching) alarm

- Visual notification only in *approved* locations

b. Oxygen levels below 175 percent – 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 gas detection system shall be connected to the building fire alarm control panel. A fire alarm permit is required in accordance with Section 130.3 of the *Administration of the City of Englewood Building Code.*

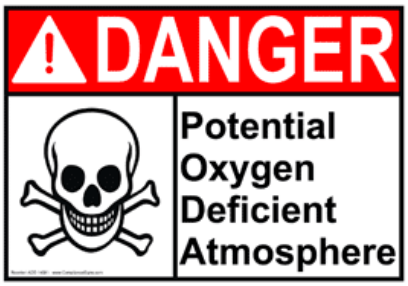
5. Signage shall be required adjacent to each horn/strobe as follows.

Outside the Storage Area/Room: **"DO NOT ENTER WHEN LIGHT IS FLASHING – OXYGEN DEFICIENT ATMOSPHERE DETECTED – CALL 911"**

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 1-inch block lettering with a minimum ¼-inch stroke. The sign shall be on a contrasting surface of black on yellow and shall be of durable construction.

On the door of the Storage Room*:* 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.

5307.6.5 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.

5307.6.6 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.

5307.6.6.1 Records. A written record of all required inspections, testing, calibration, and maintenance shall be maintained in a logbook on the premises containing the three most current years of records and be available for review by fire inspection personnel.

5307.6.6.2 Required inspections and testing. All piping installations shall be tested and inspected in accordance with Sections 5307.6.6.2.1 through 5307.6.6.2.5.

5307.6.6.2.1 Acceptance testing. Appliances and equipment shall not be placed in operation until after the piping system has been checked for leakage and detectors, notification appliances and automatic shutoff valves 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 the fire code official and/or building official. Provide an inspection report to the fire code official and/or building official for the piping and joint visual inspection and pressure test.

5307.6.6.2.2 Daily inspections. All detectors and alarms shall be visually inspected daily. These inspections are permitted to be conducted by trained employees.

5307.6.6.2.3 Monthly inspections. All storage vessels, piping, and appurtenances shall be visually inspected monthly. These inspections are permitted to be conducted by trained employees.

5307.6.6.2.4 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.

5307.6.6.2.5 Alterations and repair. In the event alterations, repairs or additions are made, the affected piping shall be retested in accordance with Section 5307.6.6.2.1.

5307.6.6.3 Reserved.

5307.6.6.4 Calibration. Detectors shall be checked for accuracy, calibrated to a reference gas concentration, and span reset.

5307.6.6.5 Pressure testing. Pipe joints shall be exposed for examination during the test.

5307.6.6.5.1 Test medium. The test medium shall be air, nitrogen, carbon dioxide, or an inert gas.

5307.6.6.5.2 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.

5307.6.6.5.3 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 5307.6.6.2.1.

5307.6.6.5.4 Test preparation. All joints and fittings shall be exposed for examination during and after the test.

5307.6.6.5.4.1 Pipe clearing. Prior to testing, the interior of the pipe shall be cleared of all foreign material.

5307.6.6.5.4.2 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.

5307.6.6.5.4.3 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.

5307.6.6.5.4.4 Test pressure. The test pressures shall be as specified in Section 5307.6.6.2.1. 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.

5307.6.6.5.5 Test duration. The test duration shall be not less than ½-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.

5307.6.6.5.6 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

5307.6.6.5.7 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.

5307.6.6.5.8 Corrections. Where leakage or other defects are located, the affected portion of the piping system shall be repaired or replaced and retested.

5307.6.7 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.

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 105.5, the applicant shall file with the Fire Prevention Division 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 and City of Englewood Fire Marshal's Office 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 105.5 to be supervised at any time by the *fire code official* in order to determine compliance with all safety and fire regulations. Pyrotechnics personnel approved by the *fire code offical* 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 Nonapplicability is amended by replacing Item 10 and adding Item ~~12~~ 14 as follows:

10. The manufacture, storage, dispensing, and use of alcoholic beverages with 16 percent or less alcohol by volume and the remaining constituents having no hazardous properties regulated by the City of Englewood Building Code or City of Englewood Fire Code.

14. The manufacture, storage, dispensing, and handling of alcohol beverages with greater than 16 percent ~~%~~ alcohol by volume shall be in accordance with Chapter 40.

Section 5701.5.1 Altitude correction is added as follows:

5701.5.1 Altitude correction. 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 degree ~~°~~ F and may cause reclassification of flammable and combustible liquids. Altitude reclassification shall be documented on submitted plans.

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 Section 5704.2.14, or where *approved* by the *fire code official* safeguarded in accordance with 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 5704.3.3 Indoor storage is amended by deleting Exception 2

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 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 6004.2.2.10.1 Alarms is replaced as follows:

6004.2.2.10.1 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 916. Signage required by Section 916 shall state; outside the room: **"DO NOT ENTER WHEN LIGHT IS FLASHING – [HIGHLY] TOXIC GAS LEAK DETECTED."** And inside the room: **"FLASHING LIGHT MEANS [HIGHLY] TOXIC GAS LEAK DETECTED – EVACUATE ROOM AND BUILDING."**

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 *City of Englewood 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 916.10. Signage required by Section 916.9 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. 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 used in accordance with this Section, NFPA 58, and the applicable provisions of Chapters 3, 6, 31, 33 and 61.
2. Dispensing installations and operations in accordance with this Section, NFPA 58 and the applicable provisions of Chapter 23.

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 pounds. (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 *one- and two-family dwellings* constructed under the *City of Englewood Residential Code*, a maximum of 40 pounds of propane [or two 20-pound cylinders—one for use and one spare bottle] shall be permitted on the premises and a maximum of 5.4 pounds of propane (in maximum 2.7-pound cylinders) shall be permitted within the *dwelling*, including attached and detached garages.
3. For *townhouses*, condominiums, and apartments, one 20-pound 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 "Section 312 of the City of Englewood Fire Code."

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 pounds (9.07 kg) per individual transaction.

Section 6112 Fixed, Mobile, or Temporary Concessions Protections is added as follows:

SECTION 6112
FIXED, MOBILE, OR TEMPROARY CONCESSIONS PROTECTIONS

6112.1 Required Installations. Cooking equipment used in fixed, mobile, or temporary concessions, such as trucks, buses, trailers, and structures shall be limited to two 40-pound cylinders (maximum). All Department of Transportation cylinders shall have an overfill protection device (OPD) installed. Properly installed ASME tanks do not require an OPD (Overfill Protection Device).

Exception: Where fixed structures are governed by the *City of Englewood Mechanical Code*, *City of Englewood Commercial Building Code* and *City of Englewood Fuel Gas Code*.

6112.1.1 Cooking equipment. Listed and labeled for the intended application. The equipment shall be installed in accordance with NFPA 58 and this Chapter.

6112.1.2 Cylinder. Shall be mounted to prevent jarring loose, slipping, rotating, or any damage to the tank. The brackets and fastenings shall be designed and constructed to withstand any movement of the LPG tank.

6112.1.3 Piping. All piping shall be installed, tested and inspected in accordance with NFPA 58 and this Chapter.

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 – 2022 Edition Volumes 1 through 15

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

Addition: Reference the following standards:

ANSI A10-4 – 2016 ANSI/ASHRAE 15–2004 ASCE ASCE 21 – as adopted by State of CO ASME	American National Standards Institute 25 W 43rd Street, Fourth Floor New York, NY 13045 Safety Requirements for Personnel Hoists and Employee Elevators Safety for Refrigeration Systems American Society of Civil Engineers 101 Constitution Avenue NW Washington, D.C. 20001

ASME A17.1/CSA B44 ASME A17.3 ASME A18.1 ASME A90.1 – 2009 ASME B20.1 – 2012 ASME B31 – 2016 Chlorine Manual 6th printing — 2000	Automated People Mover Standards (as adopted by the State of Colorado - Parts 1 through 4, as amended by ASCE) American Society of Mechanical Engineers Three Park Avenue New York, NY 10016-5990 Safety Code for Elevators and Escalators (as adopted by the State of Colorado) Safety Code for Existing Elevators and Escalators

	(as adopted by the State of Colorado) Safety Standard for Platform Lifts and Stairway Chair Lifts (as adopted by the State of Colorado) Safety Standard for Belt Manlifts Safety Standard for Conveyors and Related Equipment Standard for Pressure Piping		National Chlorine Institute 1300 Wilson Boulevard, Suite 525 Arlington, VA 22209

Addition: Reference the following standard:

Institute of Makers of Explosives	Institute of Makers of Explosives1575 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

INTERNATIONAL FIRE CODE APPENDICES
STATUS OF APPENDICES ON ADOPTION

Appendices are Added, Adopted, Adopted as Amended, or Not Adopted as part of this code as Provisions in Appendices that are added, adopted, or adopted as amended carry the full weight and mandatory enforceability of the Code.

APPENDIX	TITLE	STATUS
A	Board of Appeals	Not Adopted
B	Fire-flow Requirements for Buildings	Adopted as Amended
C	Fire Hydrant Locations and Distribution	Adopted as Amended
D	Fire Apparatus Access Roads	Not Adopted
E	Hazard Categories	Not Adopted
F	Hazard Ranking	Adopted
G	Cryogenic Fluids—Weight and Volume Equivalents	Not Adopted
H	Hazardous Materials Management Plan (HMMP)	Not Adopted
I	Fire Protection Systems—Noncompliant Conditions	Not Adopted
J	Building Information Sign	Not Adopted
K	Construction Requirements for Existing Ambulatory Care Facilities	Not Adopted
L	Requirements for Fire Fighter air Replenishment systems	Not Adopted
M	High-rise Buildings – Retroactive Automatic sprinkler Requirements	Not Adopted
N	Indoor Trade Shows and Exhibitions	Not Adopted
O	Shop Drawing and System Graphic Requirements for Permit Application	Added

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 Section B104.3 of the *International Fire Code*. In buildings with mixed construction types as defined in *the International Building Code*, the fire-flow calculations shall follow the method described in the *2018 International Fire Code Commentary*.

Section B104.2.1 Townhouses is added as follows:

B104.2.1 Townhouses. Where buildings are constructed as *townhouses* in accordance with the *International Residential Code*, each separate *townhouse unit* shall be considered a *fire-flow calculation area*, with *fire flow* determined for the largest unit.

Exception: *Townhouses* constructed in accordance with the *International Building Code*.

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: 2021 IFC WITH 2022 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 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 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

International Fire Code 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 Englewood Water Department *Operating Rules and Engineering Standards* unless specifically approved by the Englewood Water Department.

APPENDIX O SHOP DRAWING SUBMITTAL REQUIREMETNS FOR CONSTRUCTION PERMITS REQUIRED BY SECTION 105.6 is added as follows:

APPENDIX O
SHOP DRAWING SUBMITTAL REQUIREMENTS FOR CONSTRUCTION PERMITS

SECTION O101
GENERAL

O101.1 General. Visit the City of Englewood Fire Department online portal for Policy Appendix O for the most current requirements.