

A Resolution Adopting and Amending the 2021 Edition of the International Fire Code®

WHEREAS, Lyons Fire Protection District (“*District*”) is a political subdivision of the State of Colorado, organized pursuant to the Colorado Special Districts Act, C.R.S. §32-1-101, *et seq.* (“*Act*”), to provide, among other services, fire prevention through interpretation, application, and enforcement of a fire code and the applicable provisions of the Act;

WHEREAS, the District’s jurisdiction encompasses the Town of Lyons (“*Town*”) and portions of Boulder County and Larimer County (collectively the “*Counties*”);

WHEREAS, the Act authorizes the District’s Board of Directors (“*Board*”) to adopt and enforce a fire code within the District’s jurisdiction; provided, however, that a fire code adopted by the Board can only be enforced within the Town and the Counties if it is first approved by the Town’s Board of Trustees and the Board of County Commissioners for each of the Counties;

WHEREAS, C.R.S. § 32-1-1002(3)(b)(I) of the Act requires the District's Fire Chief to "enforce all laws of this state and ordinances and resolutions of the appropriate political subdivisions relating to the prevention of fires and the suppression of arson";

WHEREAS, the District currently interprets, applies and enforces the 2015 Edition of the International Fire Code, with local amendments (“*2015 Fire Code*”);

WHEREAS, the District’s Fire Chief and Fire Marshal have reviewed the 2021 Edition of the International Fire Code (“*2021 Fire Code*”) and have recommended adoption by the Board, with certain amendments; and

WHEREAS, the 2021 Fire Code is a model code that establishes rules and standards for the regulation of fire and explosion hazards arising from the storage, handling and use of hazardous substances, materials, and devices and from conditions hazardous to life and property in the occupancy of buildings and premises; and

WHEREAS, the Board deems it necessary and in the best interest of public safety to adopt, interpret, apply, and enforce the 2021 Fire Code for the purpose of establishing rules and standards for the prevention of fire and the protection of the life, health, property, security, and welfare of the inhabitants within, and visitors to, the District; and

WHEREAS, in accordance with the Act, the Board intends to submit the 2021 Fire Code to the

Town's Board of Trustees and the Board of County Commissioners for each of the Counties for approval. The Board further intends that the 2021 Fire Code shall not apply within the Town or either of the Counties until the Board of Trustees has adopted the 2021 Fire Code within the Town and the Board of County Commissioner for each of the Counties has adopted the 2021 Fire Code within the respective boundaries of the Counties that lie within the District's jurisdiction.

**NOW THEREFORE BE IT RESOLVED BY THE BOARD OF
DIRECTORS OF THE LYONS FIRE PROTECTION DISTRICT
THAT:**

1 Adoption of the 2021 Edition of the International Fire Code

1.1 2021 Edition of the International Fire Code Adopted

The 2021 Edition of the International Fire Code, as amended herein, is adopted, including the following appendices: Appendix B, Fire-Flow Requirements for Buildings; Appendix C, Fire Hydrant Locations and Distribution; Appendix D, Fire Apparatus Access Roads; Appendix F, Hazard Ranking; Appendix H, Hazardous Materials Management Plan (HMMP) & Hazardous Materials inventory Statement (HMIS) Instructions; Appendix I, Fire Protection Systems – Noncompliant Conditions.

The date on which this Resolution shall take effect shall be the date of approval by the governing body where the property is located (County Commissioners for Boulder County or Larimer County or the Town of Lyons Board of Trustees). This Fire Code shall be in effect within the boundaries of the Lyons Fire Protection District.

1.2 Fire Code Described

The 2021 Edition of the International Fire Code is published by the International Code Council, 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001-2070.

1.3 Copies on File

At least one copy of the 2021 Edition of the International Fire Code shall be kept on file in the administrative offices of the Lyons Fire Protection District, 251 Broadway, Lyons, Colorado, 80540 and may be inspected during regular business hours.

1.4 Purpose

The purpose of this Fire Code is to establish the minimum standards consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion, and dangerous conditions in new and existing buildings, structures, and premises, and to provide for the safety of firefighters, and emergency responders during emergency operations.

2 Definitions

Wherever the term “**Board of Directors**” is used, it shall be held to mean the Board of Directors of the Lyons Fire Protection District.

Whenever the term “**Fire Code**” is used, it shall mean the 2021 Edition of the International Fire Code as amended herein.

Wherever the word “**District**” or phrase “**Fire District**” is used, it shall mean the Lyons Fire Protection District.

Wherever the term “**International Building Code**” is used, it shall mean the Building Code as adopted, amended, and incorporated into the applicable Building Code for Boulder County, Larimer County, or the Town of Lyons.

Wherever the term “**National Electrical Code**” is used, it shall mean the Electrical Code as adopted, amended, and incorporated into the applicable Electrical Code for Boulder County, Larimer County, or the Town of Lyons.

3 Amendments Made In and To the Fire Code

The Fire Code is amended as follows:

1. Subsection 101.1 **Title**. Section 101.1 is amended to read: “These regulations shall be known as the Fire Code of the Fire District.”
2. **102.13 Conflicts with Other Adopted Codes.** Where a conflict arises between this Fire Code and the International Building Code and/or the International Residential Code, the more stringent application of the respective codes shall apply.

Exception: When any provision from the respective codes is agreed upon by the Chief Building Official of the Town or County having jurisdiction and the Fire Code Official

as being applicable and acceptable.

3. Subsection 104.7 **Liability**. Section 104.7 is amended by the addition of the following sentence at the end of the section: "Nothing in this Fire Code is intended, and shall not be construed, as a limitation or waiver of rights, privileges, benefits, limitations and immunities provided the Fire District and its directors, officers, employees, volunteers, and agents under federal and state law, including but not limited to, the Colorado Governmental Immunities Act, C.R.S. 24-10-101, *et seq.*"
4. Subsection 104.11 **Fire investigations**. Section 104.11 is amended by the addition of the following sentence at the end of the section: "While performing duties as an arson investigator, the Chief of the District, or authorized designee, including all fire code officials, shall act as peace officers to the extent authorized in C.R.S. 16-2.5-109."
5. Subsection 104.12 **Authority**. Section 104.12 is amended by the addition of the following sentence at the end of the section: "While performing duties as an arson investigator, the Chief of the District, or authorized designee, including all fire code officials, shall act as peace officers to the extent authorized in C.R.S. 16-2.5-109."
6. Subsection 105.1.1 **REQUIRED OPERATIONAL PERMITS**: Subsection 105.1.1 is amended to read:

105.1.1 **Required Permits**. Unless otherwise specified in this Fire Code, the Fire Code Official is authorized to issue just the following permits prior to engaging in the following activities, functions, operations, or practices:

 - a. **105.5.28 Liquid or gas-fueled vehicles or equipment in buildings for display, demonstrating, or operation**. Section 105.5.28 is amended to read: "This shall not apply to parking garages, private garages, repair garages, or other buildings normally utilized for the operation, repair, restoration, and storage of motor vehicles."
 - b. **105.5.49 Temporary membrane structures and tents**. Section 105.5.49 is amended to read: "An operational permit is required to operate an air-supported temporary membrane structure, a temporary stage canopy or a tent having an area in excess of 500 square feet."
7. Subsection 105.5.34 Subsection 105.5.34 is amended to read as follows: "When no permit shall be required or burning is regulated pursuant to the regulations promulgated under Section C.R.S. 25-7-123, and regulated by the Boulder or Larimer County Health Department, as applicable."
8. Subsection 111 is repealed in its entirety and reenacted to read as follows:
 - a. **111.1 Appeals Procedure – General**. Any person, firm, or corporation who is grieved by an application, interpretation, or order made by Fire District personnel, pursuant to any provision of this Fire Code for the standards adopted, may, within business days of the action taken by Fire District personnel, file a written notice of appeal with the

Fire District requesting a hearing before the Fire Chief. All appeals must be made in writing to the Fire Chief at the Fire District's administrative office. The Fire Chief shall establish reasonable rules for such appeal and shall make a record of all proceedings. The decision of the Fire Chief shall be considered a final administrative decision.

b. **111.1.2 Appeals Procedure – Administrative Decisions.** To determine the suitability of alternate materials and types of construction and to provide for reasonable interpretations of the provisions of this Fire Code, upon request of an interested party, including the Fire Chief or designee, there were, and is hereby created a board of appeals consisting of five members who are qualified by experience and training to pass judgment upon pertinent matters. The board of appeals shall be appointed by the Board of Directors and shall hold office at its pleasure. The board of appeals shall adopt reasonable rules of procedure for conducting its business, and shall render all interpretations, decisions, and findings in writing to the appellant or requesting party with a duplicate copy to the Fire Chief. All appeals of the Fire Chief's decision shall be made in writing, within five days of the date of the Fire Chief's decision, to the board of appeals by delivery to the Fire Chief or designee at the Fire District's administrative office.

111.1.3 ENFORCEMENT AND APPEALS

111.1.3.1 The Fire Chief shall enforce this Fire Code in accordance with the procedures set forth in this Fire Code and C.R.S. 32-1-1002.

111.1.3.2 A Notice of Violation or Hazard may be issued by the Fire Chief or designee concerning violations or hazards which are not corrected on-site during an inspection area and an Order to Comply may be issued by the Fire Chief or designee for:

111.1.3.3 failure to correct a violation or hazard within the time specified in a previously issued Notice of Violation or Hazard; or

111.1.3.4 violating this Fire Code or state statute and said violation renders the building, structure, or premises especially liable to fire or is a hazard to the safety of the occupants thereof, or which is so situated as to endanger other property as set forth in Section C.R.S. 32-1- 1002(3), whether or not a Notice has been previously issued.

111.1.3.5 An appeal of a Notice of Violation or Hazard may be made in accordance with the provisions of this Fire Code.

111.1.3.6 An appeal of an Order to Comply may be made in accordance with the provisions of this Fire Code only if no previous appeal has been made of a previously issued Notice of Violation or Hazard concerning the same violation or hazard.

111.1.3.7 If no appeal is made pursuant to this Fire Code, or to the court pursuant to Section C.R.S. 32-1-1002(3), and compliance with an Order and or correction of a hazard has not occurred, the Fire Chief or designee may instruct a Sheriff's Deputy for Boulder or Larimer County, as applicable, to issue a summons or a citation for the Boulder or Larimer County District Court, as applicable.

1111.1.3.8 For appeals of a Notice of Violation or Hazard, which is issued pursuant to Section 41, paragraph (a)2 herein, the appeal shall suspend the time limits for compliance or correction of a fire hazard or hazards until the appeal is resolved. An appeal shall not suspend the time limit for compliance or correction of life safety deficiencies or violations. An appeal of an Order issued pursuant to section 41, paragraph b2 herein shall not suspend the time limits for compliance or correction, and compliance or correction shall be made unless the Order is suspended pursuant to the procedures set forth in this Fire Code.

9. Subsection 112.4 is amended to read as follows:

112.4 Violation penalties. Persons who violate a provision of this Fire Code or fail to comply with any of the requirements thereof or who correct, install, alter, repair, or do work in violation of the approved construction documents or directions of the fire code official or of a permit or certificate used under the provisions of this Fire Code, shall be guilty of a misdemeanor, punishable by a fine of not more than \$250. Each day that a violation continues after due notice has been served shall be deemed a separate offense.

10. Subsection 113.4 is amended to read as follows:

113.4 Failure to comply. Any person who shall continue any work after having been served a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be guilty of a misdemeanor, by a fine of not more than \$250. Each day that a violation continues after due notice has been served shall be deemed a separate offense.

Subsection 107 is deleted in its entirety and replaced with:

107 Fees

a. 107.1 Fees for inspection related services pursuant to the provisions of this Fire Code shall be established from time to time by resolution of the Board of Directors pursuant to Section C.R.S. 32-1- 1002(1)(e). Said fees and charges may include a charge for reimbursement to the Fire District of any consultation fees, expenses or costs incurred by the Fire District in the performance of inspection related services pursuant to provisions of this Fire Code.

1) Inspection Fee

Fees for re-inspections, for inspections outside normal business hours, or for inspections for which no fee is otherwise established may be charged.

2) Plan Review Fee

The plan review fee is intended to cover the significant costs and expenses incurred by the fire district in reviewing materials necessary to perform appropriate inspections of construction, uses, processes, and operations. The fee shall be assessed based on the reasonable, customary, and necessary time associated with reviewing or evaluating site plans; construction documents and calculations; changes, additions, or revisions to approved plans; construction documents resubmitted after the fire code official's issuing a statement explaining the reasons

that a previous submittal does not conform to the requirements of this Fire Code. When submittal documents are incomplete or changed so as to require additional plan review, an additional plan review fee shall be charged. The plan review fee required by this Section is separate from the construction permit fee.

3) Unauthorized Work Inspection Fee

Any person or entity that commences any work before obtaining a construction permit required by Section 105 shall be subject to an inspection fee in an amount equal to the amount of the construction permit fee. The fee shall be separate from and in addition to a construction permit fee. Payment of the inspection fee shall not relieve any person from compliance with all other provisions of this Fire Code or from any penalty prescribed by law. The inspection fee shall be assessed regardless of whether or not a construction permit is then or subsequently issued.

EXCEPTION: When approved in writing by the fire code official, work may commence prior to obtaining a construction permit.

- 4) Payment of Fees. A permit shall not be valid until the fees prescribed by the Fire Code or law have been paid; nor shall an amendment to a permit be released until additional fees, if any, have been paid.
- 5) Related Fees. The payment of the fee for construction, uses, processes, or operations authorized by an operational permit or construction permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law or required by Section 107.

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

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

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

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

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

APPLIANCE. Visible notification component such as a bell, horn, speaker, light, or text that provides audible, visible, and/or tactile outputs to alert occupants of a hazardous condition. Single-station alarms contain both a [initiating] device and an [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 (as defined by Alcohol Tax & Trade Bureau). A drinkable spirit intended for human consumption, including neutral spirits or alcohol (i.e., vodka or grain spirits), whiskey, gin, brandy, blended applejack, rum, Tequila, cordials and liqueurs.

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

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

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

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

- a. It has been evaluated by the International Agency for Research on Cancer (IARC) and found to be a carcinogen or potential carcinogen, or
- b. 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
- c. It is regulated by OSHA as a carcinogen.

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

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

CENTRAL FUEL-BURNING APPLIANCE ROOM. A room containing a fuel burning appliance serving multiple dwelling units, such as a boiler, 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 I LIQUIDS. Used in Chapter 38 to identify ethanol mixtures that are Class IB or Class IC flammable liquids.

CLASS I FIRE ALARM MONITORING. The monitoring of a fire alarm system by a licensed central station that is required by the Town of Lyons, Boulder County or Larimer County Building and Fire Codes.

CLASS II FIRE ALARM MONITORING. The monitoring of a fire alarm system by a licensed central station that is not required by Town of Lyons, Boulder or Larimer County Building and Fire Codes.

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

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

CONTAINER. Any closed vessel of 119 gallons (450 L) or less capacity used for transporting or storing Class I liquids, not intended for fixed installation and not constructed of wood, but 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.

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 an [notification] appliance.

DISTILLATION. The separation and concentration of the constituents of an ethanol mixture by slowly raising the temperature of the mixture through the boiling points of its

constituents then collecting and condensing the constituent vapors separately from the mixture.

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

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

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

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

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

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

EMERGENCY shall mean one or more of the following:

- a. Fire, regardless of size or type
- b. Explosion
- c. Building, structure, or utility failure
- d. Rescue operations involving humans or animals, including people trapped in elevators due to power failure or mechanical malfunctions.
- e. Failure of or damage to fire protection or life safety systems
- f. Exposure to a hazard(s)
- g. Panic
- h. Hazardous material leak or spill
- i. Overcrowding of any building or premises
- j. Rescue operations involving humans or animals injured or trapped in buildings, trenches, scaffolding, grandstands, etc.
- k. 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.

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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 C₂H₅OH or C₂H₆O).

ETHANOL MIXTURE. Liquid mixture comprised of ethanol and materials with hazards not regulated by the Town of Lyons, Boulder or Larimer County Building and Fire Code, namely water.

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

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

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

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

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

HAZ MAT (HAZARDOUS MATERIALS). Materials with hazards regulated by the Town of Lyons, Boulder or Larimer County Building and Fire Code.

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

HAZMAT MANAGEMENT PLAN (HMMP). A portion of 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 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 APPARATUS ACCESS. The lowest level of fire apparatus access shall be measured from the lowest elevation of any required fire apparatus access road located no more than 30 feet from any exterior wall of the building.

a. 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 apparatus 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 apparatus access, the fire code official is authorized to require additional fire protection systems as required by Chapter 9.

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

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

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

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

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

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

NON-DEDICATED SMOKE CONTROL SYSTEM. Smoke control components and equipment that are shared with other systems, such as the building HVAC system. Upon

activation of fire alarm, non-dedicated smoke control equipment changes mode of operation to achieve the smoke control performance objectives. “Non-dedicated systems” shall refer only to equipment and components controlled from the firefighters’ smoke control panel.

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

NORMALLY OPEN. A system or vessel in an ABPF used in the storage, production, dispensing, blending, bottling, or handling of Class 1 Liquids that, for 50 percent or more of the time it is in operation, its contents are continuously exposed to atmosphere and vulnerable to evaporation, or where a Class 1 Liquid at or above its flash point is exposed to atmosphere at any time during transfer, dispensing, or release. Continuous blending or maceration in uncovered vessels, open draining of Class 1 Liquids above their flash points, and the act of “bleeding” heads (the initial vapors generated during distillation) or tails (the last vapors generated during distillation) to atmosphere are typically considered normally open.

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

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

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

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

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

OPEN BURNING. Is further defined in Appendix O

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

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

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

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

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

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

PROCESS DESCRIPTION. An operational description such as a flow chart of the sequence of events required to convert raw materials from the state in which they enter the APBF through each development point until the finished products are derived. The process description identifies all input and output materials and includes quantities, concentrations, temperatures, pressures, types of equipment, systems, etc. at each development point using code-based terminology, e.g., “37 gallons of 55% ABV at standard temperature and pressure (STP)” vs. “all the high wines collected.” All systems and processes utilized to produce all intermediate and finished products are required to be included in the description.

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

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

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

RADIO FREQUENCY MAINTENANCE PLAN. The radio frequency maintenance plan is a document developed and distributed by the building owner for the purpose of

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

WORT. The sugar solution strained from mash for fermentation.

13 Subsection 507.2 is added to read as follows:

507.2.3 Type of Water Supply

In-ground cistern water supply for fire protection shall be designed, installed, and maintained to meet the requirements of Boulder or Larimer County Land Use and the Fire Code Official.

14 Subsection 507.2 is added to read as follows:

507.2.3.4 Type of Water Supply continued

Where an occupancy is close enough and has adequate access by firefighting apparatus, in the opinion of the Fire Code Official, a community cistern may be used to provide firefighting water supply, instead of an In-ground Cistern as described in Subsection 503.2.3.

15 Section 507.5 Fire Hydrant System

Section 507.5 of the Fire Code is amended to add Section 507.5.1 and 507.5.2 to read as follows:

507.5.1. Privately owned hydrants shall be maintained at the expense of the private property owner, subject to the direction and requirements of the Fire Code Official. Such private hydrants shall be flushed and tested periodically according to this Fire Code. In the event such testing reveals that the flow from private hydrants is inadequate according to applicable standards, modifications necessary to meet these standards shall be ordered by the Fire Code Official and made at the expense of the property owner. All private hydrants shall be painted the same color as hydrants on public rights-of-way or elsewhere throughout the Town of Lyons with a different color cap, that being white, to designate a private hydrant. Appropriate markings or signs restricting parking in front of or adjacent to fire hydrants shall be designated by the Fire Code Official and implemented at the expense of the owner of the property. No point of connection to any private fire hydrant shall be left uncapped without permission of the Fire Code Official.

507.5.2 Existing Private Fire Hydrants. Existing hydrants that do not conform to the Town of Lyons specifications or that do not face in the direction most consistent with emergency use by the Fire District, as established by the Fire Code Official, shall be changed to meet the Town's requirements by the property owner and at the property owner's expense, within fifteen (15) days of service of notice of the required changes upon the property owner or its resident agent.

16 Section 903: FIRE PROTECTION SYSTEMS

Section 903 of the Fire Code is amended to read as follows:

903.1.1 Alternative Protection. Only approved and listed anti-freeze solutions are allowed.

903.2.8 Group R. An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R fire area. Group R-2 and Group R-4 occupancies required to be protected with an automatic fire sprinkler system shall provide fire sprinkler coverage for all exterior balconies.

EXCEPTION: Existing Group R-2 and Group R-4 buildings and occupancies constructed prior to January 1, 2012, unless the building is undergoing renovation which is of sufficient extent that sprinkler system modifications are being completed that would provide fire sprinkler coverage on exterior balconies.

903.3.1.1 NFPA 13D Sprinkler Systems Safety Factors

All sprinkler systems installed in accordance with NFPA 13D shall have a safety factor for all hydraulic calculations in systems. This shall consist of one of the following:

- a. A five (5) percent hydraulic safety factor from the static pressure allowance.
- b. System design of no greater than 80 psi static pressure.
- c. As otherwise allowed by the fire code official.

904.3.4 Requirement for Notification is amended to add.

All sprinkler systems installed in accordance with NFPA 13D shall have a horn/strobe notification device placed on the exterior of the structure only and in a location visible to

passersby's.

17 Subsection 903.2.8 is amended to read as follows:

903.2.8 Group R and Residences constructed under the adopted version International Residential Code. An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all residences. In rural areas where there is not a static water source from a municipality and the sprinkler system is designed with a water storage tank and pump, an alternative power source shall be required and capable of running the fire pump in the event of a loss of the primary power source. The alternative power source will be required to be wired into an automatic electrical transfer switch from the primary power supplying the residence. An FDC must be provided.

18 Subsection 903.3.1.3.2 is added to read as follows:

903.3.1.2.4 Attached Garages

Residences with attached garages, where the garage may serve as an egress path, shall have the garage sprinkled, as determined by the Fire Code Official.

19 Subsection 912 is added to read as follows:

912.2.3 Fire District Connections.

Residential sprinkler systems which are supplied by atmospheric pressure tanks and fire pumps shall be installed with a Fire District Connection, the size and location of which shall be determined by the Fire Code Official.

CHAPTER 41 – ALCOHOL BEVERAGE PRODUCTION FACILITIES was added

SECTION 4101 GENERAL

4101.1 Scope.

Buildings and portions thereof where ethanol mixtures are produced, stored, handled or dispensed in the production of alcohol beverages shall be regulated in accordance with this Chapter and the Boulder County, Larimer County or Town of Lyons Building Code, as applicable, and this Fire Code.

The intent of this Chapter is to establish minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing alcohol beverage production facilities (ABPFs) such as distilleries, breweries, and wineries, and to provide safety to fire fighters and emergency responders during emergency operations. The objective is to consolidate regulations for materials, systems, processes, and conditions most commonly found in ABPFs to facilitate compliance with the intent of this chapter.

The fire and building code officials are authorized to enforce applicable provisions of the Boulder County or Larimer County Building Code, the Town of Lyons Building Code and this Fire Code, referenced standards, and recommended practices not specifically addressed in this Chapter provided they are consistent with the intent and objective of this chapter. Consideration shall be given to the unique materials and equipment utilized in this industry such as wooden casks (typically barrels) and high quality but as-yet, unlisted,

stills.

Unless otherwise noted, where provisions in this Chapter conflict with provisions in other sections of the Boulder County or Larimer County Building Code, the Town of Lyons Building Code, or this Fire Code for ABPFs, the provisions of this Chapter shall supersede the provisions in those sections.

4101.2 Referenced standards.

The fire and building code officials are authorized to enforce applicable provisions of the standards listed in Chapter 80 of the Fire Code, as amended, and International Building Code, Chapter 35, as amended, to ensure the safe operation of ABPFs. Table 4101.2 lists the standards most often utilized for ABPFs.

Table 4101.2 Referenced Standards

DOCUMENT	TITLE
NFPA 13	Standard for the Installation of Sprinkler Systems
NFPA 30	Flammable and Combustible Liquids Code
NFPA 61	Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities
NFPA 69	Standard on Explosion Prevention Systems
NFPA 70	National Electrical Code (NEC)
NFPA 72	National Fire Alarm and Signaling Code
NFPA 505	Fire Safety Standard For Powered Industrial Trucks Including Type Designations, Areas Of Use, Conversions, Maintenance, And Operations
NFPA 704	Standards System for Identification of the Hazards Materials for Emergency Response
NFPA 780	Standard for the Installation of Lightning Protection Systems

4101.3 Recommended practices.

The fire and building code officials shall have the authority to utilize the recommended practices listed in Table 4101.3 to render interpretations and develop policies and procedures in the application of the provisions of the Boulder County or Larimer County Building Code, the Town of Lyons Building Code and this Fire Code and referenced standards. Such interpretations, policies, and procedures shall be in compliance with the intent and objective of this Chapter.

Table 3801.3 Recommended Practices

NFPA 77	Recommended Practice on Static Electricity
NFPA 497	Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas

NFPA 499	Recommended Practice for the Classification of Combustible Dusts and of Hazardous Locations for Electrical Installations in Chemical Process Areas
The Distilled Spirits Council of the United States, Inc.	Recommended Fire Protection Practices for Distilled Spirits Beverage Facilities

4101.4 Construction Documents.

Construction documents shall be submitted for review and permit prior to the installation, construction, or modification of ABPFs or the operational equipment therein.

4101.5 Operational Permits.

Operational permits shall be required as set forth in Section 105 and in accordance with Fire District policy.

20 SECTION 4102 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

4102.1 Definitions. See also Section 202.

4102.2 Acronyms and abbreviations.

The following acronyms and abbreviations shall, for the purposes of this Chapter, have the meanings identified below:

ABPF. Alcohol Beverage Production Facility.

ABV. Alcohol by Volume.

ASME. American Society of Mechanical Engineers.

ASTM. American Society for Testing and Materials.

HMIS. HazMat Inventory Statement.

HMMP. HazMat Management Plan.

HMPA. HazMat Permit Application.

HMR. HazMat Report.

LEL. Lower Explosive Limit.

LFL. Lower Flammable Limit.

MAQ. Maximum allowable quantity per control area in accordance with Section 5003.1.1 of this Fire Code.

MEC. Minimum Explosive Concentration.

SDS. Safety Data Sheet

NEC. National Electrical Code

TTB. Alcohol and Tobacco Tax and Trade Bureau

21 SECTION 4103 GENERAL REQUIREMENTS

4103.1 Material classification.

Hazard classifications and analyses of ethanol mixtures shall account for altitude-dependent properties based on an elevation of 5,280 feet (1,609 m) above sea level.

Ethanol mixtures that have no fire point when tested in accordance with ASTM D 92, Standard Test Method for Flash and Fire Points, by Cleveland Open Cup Tester and ethanol mixtures with 16 percent or less ABV with the remainder comprised of materials

with hazards not regulated by the Boulder County or Larimer County Building Code, the Town of Lyons Building Code and this Fire Code shall not be regulated as flammable or combustible liquids.

Ethanol mixtures with greater than 16 percent ABV and less than or equal to 34 percent ABV, and the remainder comprised of water and other materials with hazards not regulated by the Boulder County or Larimer County Building Code, the Town of Lyons Building Code and this Fire Code, shall be classified as Flammable 1C liquids.

Ethanol mixtures with greater than 34 percent ABV, and the remainder comprised of water and other materials with hazards not regulated by the Boulder County or Larimer County Building Code, the Town of Lyons Building Code and this Fire Code shall be classified as flammable 1B liquids.

4103.2 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 4103.2.1 through 4103.2.3.

4103.2.1 H-2 occupancy classification.

An H-2 occupancy classification shall be assigned to buildings or portions thereof in accordance with Sections 4103.2.1.1 and 4103.2.1.2.

4103.2.1.1 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 Chapters 22 and 50, as amended. The fire and building code officials are authorized to require technical assistance in accordance with Section 104 to establish whether the building or portion thereof is required to be assigned an H-2 occupancy classification and to determine explosion and deflagration hazard reduction criteria.

4103.2.1.2 Flammable liquids.

ABPFs and portions thereof with quantities of Class 1 Liquids in excess of the MAQs, that are stored or processed in normally open vessels or systems, or vessels or systems that are pressurized at more than 15 pounds per square inch gauge (psig; 103.4 kPa), or where a Class 1 Liquid is released to atmosphere at or above its flash point temperature as part of normal operations shall be assigned an H-2 occupancy classification.

4103.2.2 H-3 occupancy classification.

ABPFs and portions thereof with quantities of Class 1 Liquids in excess of the MAQs, that are stored or processed in normally closed vessels or systems pressurized to 15 pounds per square inch gauge (psig; 103.4 kPa) or less, shall be classified as H-3 occupancies.

Exception: Quantities of ethanol mixtures beverages exceeding the MAQs but packaged in individual containers not exceeding 1.3 gallons (5 L) in volume shall not cause the ABPF or portion thereof to be assigned an H-3 occupancy

classification.

4103.2.3 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 Boulder County or Larimer County Building Code, the Town of Lyons Building Code and this Fire Code according to the fire safety and relative hazard involved.

4103.3 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.

4103.3.1 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.

4103.3.2 Hazardous materials management plan (HMMP).

An HMMP in accordance with Section 5001.5.1 and Appendix H101 shall be provided in an approved format.

4103.3.3 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, 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.

4103.3.4 Emergency Planning.

Fire safety and evacuation plans in accordance with Section 404, as amended, shall be prepared and maintained.

4103.3.5 Storage plan.

Aisle and storage plans shall be submitted in accordance with Chapter 50, as amended.

4103.3.6 Material safety data sheets.

MSDS shall be readily available on the premises for HazMat therein.

4103.3.7 Unauthorized Discharges Preparation.

Plans and provisions shall be made for controlling and mitigating unauthorized discharges.

4103.3.8 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.

4103.3.9 Fire District liaison.

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Responsible persons shall be designated and trained to be liaison personnel to the Fire District. 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.

4103.4 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 4103.4.1 and 4103.4.2.

4103.4.1 Records.

Accurate records shall be kept of all unauthorized discharges of Class 1 Liquids by the permittee.

4103.4.2 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 District 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.

4103.5 Construction.

The construction of ABPFs shall be in accordance with Sections 4103.5.1 and 4103.5.2.

4103.5.1 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 Boulder County or Larimer County Building Code, the Town of Lyons Building Code and this Fire Code for the assigned occupancy classifications and this Chapter.

4103.5.2 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.

4103.6 Systems, features and components.

Systems, features and components shall be provided in accordance with Sections 4103.6.1 through 4103.6.13.

4103.6.1 Deflagration prevention by combustible concentration reduction.

Atmospheric concentration of flammable vapors shall be maintained at or below 25 percent of the LFL, and combustible dusts at or below 25 percent of the MEC, in all areas of the ABPF or portion thereof where they could collect or migrate. Good housekeeping shall be exercised to prevent accumulation of combustible dust on all exposed surfaces at all levels throughout the building.

Indoor storage areas and use areas are permitted to be provided with natural ventilation where it can be shown to maintain the atmospheric concentrations at or below 25 percent of the LFL and MEC for the materials under consideration.

Where natural ventilation is not adequate, Class 1 Liquid use areas, storage areas and equipment, machinery, and operations which produce or emit combustible dust, shall be provided with an approved mechanical collection and exhaust system in accordance with Sections 501, 502.1, 502.8, 502.9.5 and 503 of the International Mechanical Code.

Use areas and storage areas in ABPFs or portions thereof where Class 1 Liquid vapor concentrations cannot be maintained at or below 25 percent of the LFL, or confined enclosures where the concentration of combustible dust cannot be maintained at or below 25 percent of the MEC, shall be provided hazardous exhaust in accordance with Sections 510 and 511 of the International Mechanical Code.

4103.6.1.1 System requirements.

Exhaust ventilation systems shall comply with all of the following:

- a. Installation shall be in accordance with the *International Mechanical Code*.
- b. Mechanical ventilation over the storage area or use area shall be at a rate of not less than 1 cubic foot per minute per square foot [cfm/ft²; 0.00508 cms/m²] of floor area. Exception: Areas where Class 1 Liquids are stored in casks are permitted to be provided with an engineered ventilation system in accordance with *International Mechanical Code* Chapter 4. The air flow rate shall not be less than the greater of (1) that required to maintain the flammable vapor concentration in the storage area at or below 25 percent of the LFL, or (2) 0.06 cubic feet per minute per square foot (cfm/ft²; 0.000305 cms/m²).
- c. Systems shall operate continuously unless alternative designs are approved.
- d. 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."
- e. 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.

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- f. The location and configuration of both the inlet and exhaust air openings shall be designed to provide air movement across all portions of the floor or room to prevent the accumulation of flammable vapors and suspended dust.
- g. Exhaust air shall not be recirculated to occupied areas

4103.6.2 Spill control and secondary containment.

Spill control and secondary containment shall be provided in accordance with Sections 4103.6.2.1 through 4103.6.2.2.

4103.6.2.1 Indoor.

Spill control and secondary containment shall be provided for H-2 and H-3 occupancies in ABPFs where:

- a. The capacity of any single normally closed vessel or system with Class 1 Liquids exceeds 55 gallons (208 L);
- b. The aggregate capacity of multiple normally closed vessels or systems with Class 1 Liquids exceeds 1,000 gallons (3,785 L); or
- c. Class 1 Liquids are dispensed into or from a normally open vessel or system exceeding a 5.3-gallon (20 L) capacity.
- d. 4103.6.2.1.1 Design. The drainage system shall be in accordance with the International Plumbing Code and the following:

- 1) All portions of the drainage system including floors shall be liquid-tight and constructed of noncombustible materials compatible with ethanol.

Exception: Where approved by the fire and building code officials, and in compliance with federal, state, and local government agencies' regulations and permits, floors of buildings or portions thereof used for the bulk storage of Class I Liquids are permitted to be exposed to earth. Combustible materials such as tilled organic matter are permitted to be mixed with the dirt provided the mixture is non- combustible.

- 2) The drains and drainage system capacity shall be sized to carry the volumetric flow of water discharged from the automatic sprinkler system without backing up at the drains or pooling to a depth greater than 1/4" (6.5mm). The sprinkler coverage area used to calculate the required volumetric flow is permitted to be based on the smaller of (1) the remote area in accordance with NFPA 13 provided it is located in the area served by the drains or (2) the area of the building or portion thereof served by the drains.

Exception: When released onto the ground within a fire area, the volumetric flow of water is permitted to be reduced to account for the percolation into the soil. An engineering analysis shall be provided to establish the reduction.

- 3) Floors shall slope to drains. Impermeable curbs and floor slope shall be designed to prevent spilled Class I Liquids and water discharged from the automatic sprinkler system from flowing to adjoining areas. Floor slope shall not be less than 2%.

Exceptions:

1. Floors in existing buildings with less than 2% slope are permitted to be used provided they are made liquid tight and floor sinks are installed as necessary to preclude water discharged from the automatic sprinkler system from pooling in low spots. These drains shall be installed in addition to the drains

required in Item 2 of this section.

2. Where trench drains or a combination of impermeable curbs and trench drains surround the sprinkler coverage area, the floors shall slope to the drains at a rate of not less than 1%. Where a combination of impermeable curbs and trench drains is used, no less than 50% of the perimeter shall be protected by trench drains.
- 4) Drainage systems shall terminate in an approved secondary containment reservoir designed to contain a spill from the largest vessel in the area served by the drains plus the volumetric flow of water calculated in Item 2 above for a period of 20 minutes. An approved automatic monitoring method shall be provided to detect material in the reservoir. Monitoring devices shall be connected to approved visual and audible alarms. Reservoir capacity to accommodate the required secondary containment volume shall be maintained at all times.

Exception: Release of Class 1 Liquids and fire protection water directly into a sanitary or storm-water drainage system, onto the ground, or a combination thereof is permitted when in compliance with federal, state, and local governmental agencies' regulations and permits.

4103.6.2.2 Outdoor.

Secondary containment for outdoor storage areas shall be in accordance with Chapter 50, as amended.

4103.6.3 Occupant and property protection.

Occupant and property protection shall be provided in accordance with Sections 4103.6.3.1 through 4103.6.3.4.

4103.6.3.1 Automatic sprinklers.

An automatic sprinkler system shall be installed throughout ABPF H-2 and H-3 fire areas in accordance with Sections 4103.6.3.1.1 through 4103.6.3.1.3.

4103.6.3.1.1 Flammable liquids.

Sprinkler discharge criteria for Class 1 Liquid use areas and storage areas in ABPFs or portions thereof shall be in accordance with NFPA 30 but shall not be less than that required in accordance with NFPA 13 for Ordinary Hazard Group 2 with a minimum design area of 3,000 square feet (279 m²).

Exception: H-2 and H-3 occupancies with storage of Class 1 Liquids in casks shall be protected by a sprinkler system designed for Extra Hazard 2 in accordance with NFPA 13, or by an approved engineered design.

4103.6.3.1.2 Combustible dust producing operations.

Automatic sprinkler protection criteria for H-2/Combustible Dust Producing Operations shall be determined in accordance with Section 4103.2.1.1.

4103.6.3.1.3 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.

4103.6.3.2 Sprinkler system supervision and alarms.

Automatic sprinkler systems shall be electrically supervised in accordance with Section 903.4, as amended. Audible and visible occupant notification upon activation of water flow shall be provided in accordance with Section 907.5, as amended, throughout all areas in ABPFs with automatic sprinkler protection.

4103.6.3.3 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 4103.6.3.3.1 through 4103.6.3.3.3 shall be provided in H-2 and H-3 occupancies in ABPFs.

4103.6.3.3.1 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 each interior exit, exit access, or exit discharge door in the exterior wall.

Manual fire alarm boxes shall be installed at not more than 150-foot (45,720 mm) intervals along corridors, interior exit stairways or ramps, or exit passageways where Class 1 Liquids are transported.

4103.6.3.3.2 Notification.

Emergency alarm audible and visible occupant notification shall be provided in accordance with Section 907.5, as amended, throughout fire areas containing H-2 or H-3 occupancies.

4103.6.3.3.3 Annunciation.

The emergency alarm system shall be monitored and annunciated as a separate zone at the Fire Alarm Control Panel (FACP). A separate emergency alarm panel is required when prescribed by other sections of the Boulder County or Larimer County Building Code, the Town of Lyons Building Code and this Fire Code for regulated hazards other than, or in addition to, Class 1 Liquids or combustible dust production in the manufacture of ethanol mixtures. When the emergency alarm system is activated, information shall be communicated to the supervising station that the zone in alarm contains flammable liquids or combustible dust, or both.

4103.6.3.4 Portable fire extinguishers.

A minimum of one approved portable fire extinguisher complying with Section 906, as amended, and having a rating of not less than 20-B shall be located not less than 10 feet (3048 mm) or more than 50 feet (15 240 mm) from any Class 1 Liquid storage area or use area or combustible dust production area.

4103.6.4 Electrical.

Electrical wiring, equipment and systems shall be installed and maintained in ABPFs in accordance with NFPA 70 (NEC) and Section 605 and Sections 4103.6.4.1 through 4103.6.4.4.

3803.6.4.1 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 it cannot be justified to the fire and building code official during design review, and subsequently demonstrated to the fire code official on annual inspections, that an atmospheric concentration at or below 25 percent of the LFL or MEC can be maintained.

A classified area shall not be required to extend beyond an unpierced floor, roof or other solid partition that prevents the migration of liquids, vapors and dust.

4103.6.4.1.1 Stills.

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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).

4103.6.4.1.2 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).

4103.6.4.1.3 Other applications.

The fire code official is authorized to determine the extent of the Class 1 electrical equipment and wiring location when a condition is not specifically covered by this chapter, Section 5703.1.1 or NFPA 70 (NEC).

4103.6.4.1.4 Industrial trucks.

Powered industrial trucks used in areas designated as classified electrical locations in accordance with Section 4103.6.4.1 shall be listed and labeled for use in the intended environment in accordance with NFPA 505.

4103.6.4.2 Grounding.

Equipment used for grain or Class 1 Liquids shall be electrically connected in accordance with NFPA 70 (NEC) and NFPA 77, and Sections 4103.6.4.2.1 and 4103.6.4.2.2 to prevent the accumulation of static electricity and sparking.

4103.6.4.2.1 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 `

Nozzles and vessels used for the transfer of Class 1 Liquids shall be electrically interconnected by:

- a. Metallic floor plates on which vessels stand while filling, when such floor plates are electrically connected to the fill stem; or
- b. 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.

4103.6.4.2.2 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.

4103.6.4.3 Lightning protection.

Lightning protection in accordance with NFPA 780 shall be provided on ABPFs with an

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H-2 occupancy; on miscellaneous structures with a combustible dust production hazard due to the storage, handling, or processing of grains; and on ABPFs with an H-2 occupancy and a still having a 750 gallon (2839L) or larger capacity, or aggregate bulk storage of Class I Flammable Liquids of 7,800 gallons (29,526L) or greater.

4103.6.4.4 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, as amended.

Exception: Subject to the fire and building code officials, standby power for mechanical ventilation and limit control systems shall not be required where an approved fail-safe engineered system is installed.

4103.6.5 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 4103.6.3.1, the fire and building code officials are authorized to reduce the minimum separation distances to not less than 1 foot (305 mm), or the minimum separation distances required by other provisions of the Boulder County or Larimer County Building Code, the Town of Lyons Building Code and this Fire Code , whichever is greater.
- 2) Where the capacity of the largest still or vessel within the minimum separation distance is 250 gallons (946 L) or less, the aggregate volume of all stills and vessels within the minimum separation distance is 750 gallons (2839 L) or less, the normal operating pressure of all vessels within the minimum separation distance is 2.5 psig (17.2 kPa) or less, and the ABPF is protected throughout with an automatic sprinkler system in accordance with Section 3803.6.3.1, the minimum separation distance to lot lines is permitted to be 1 foot (305 mm), or the minimum separation distances required by other provisions of the Boulder County or Larimer County Building Code, the Town of Lyons Building Code and this Fire Code, whichever is greater.

4103.6.6 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.

4103.6.7 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.

4103.6.8 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

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Class 1 Liquids, and in Class 1 Liquid storage areas, use areas and combustible dust production areas, and at the entrances thereto in accordance with applicable federal, state, and standards regulations, Sections 4103.6.8.1 through 4103.6.8.6, Chapters 50 and 57, as amended, and NFPA 704, or as approved. Content shall be in English, symbols.

permitted by this code and referenced standards, or both. Placards shall be in accordance with NFPA 704. The fire code official is authorized to require additional signs and placards at specific entrances and locations. Markings, labels, signs, and placards shall not be obscured or removed.

Exception: Casks are not required to be labeled.

4103.6.8.1 Warning signs.

Warning signs shall be of an all-weather material, have a yellow background with black or red text or symbols, and shall convey the danger being identified. Warning sign text shall not be less than 3 inches (76 mm) in height with a 5/8 inch (15 mm) stroke.

4103.6.8.2 Information signs.

Information signs shall be of an all-weather material, have a blue background with white or red text or symbols, or a white background with blue text, and shall convey the information required. Information sign text shall not be less than 3 inches (76 mm) in height with a 5/8-inch (15 mm) stroke.

Exception: Where otherwise specified by applicable regulations or standards.

4103.6.8.3 Location.

Placards shall be located in accordance with NFPA 704 and shall be provided on the outside of each interior exit or exit access door in the fire barrier walls separating the H-2 or H-3 occupancies, and in the exterior walls surrounding the H-2 or H-3 occupancies.

4103.6.8.4 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.

4103.6.8.5 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.

4103.6.8.6 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 4103.6.8 corresponding to the material therein.

Exception: Vats.

4103.6.9 Sources of ignition.

Control of sources of ignition shall be in accordance with Sections 4103.6.8.1 and 4103.6.8.2.

4103.6.9.1 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, designated smoking areas shall be separated from Class 1 Liquid storage areas and use areas and combustible dust production areas by a minimum of 25 feet (7620 mm) and shall be clearly identified with information signs in accordance with Section 4103.6.8.

4103.6.9.2 Open flames.

Open flames including barrel charring operations, and devices operating at temperatures above 680 °F (360 °C) are prohibited throughout fire areas containing Class 1 Liquid storage areas or use areas or combustible dust production areas.

Exceptions:

- 1) Areas designated as smoking.
- 2) Areas where hot work permits have been issued in accordance with this Section 105
- 3) Listed and labeled gas fired or electric unit heaters installed in accordance with the *International Mechanical Code, International Fuel Gas Code and NFPA 70 (NEC)*, located more than eight feet (2438 mm) from any edge of equipment where Class 1 Liquid vapor/air mixtures could exist under normal operations and more than three feet (914 mm) above the floor or grade level within 25 feet (7620 mm) horizontally from any equipment with Class 1 Liquids.

4103.6.10 Separation of incompatible materials.

Incompatible materials shall be separated in accordance with Section 5003.9.8.

4103.6.11 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.

4103.6.12 Protection from corrosion.

Machinery, piping, tank, process vessel, and container materials exposed to Class 1 Liquids shall be protected in accordance with Sections 4103.6.12.1 and 4103.6.12.2.

4103.6.12.1 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.

4103.6.12.2 Chemical protection.

Machinery, piping, tank, process vessel, and container materials used for Class 1 Liquids shall be protected from all chemicals to which they are exposed including ethanol. Clean-in-place (CIPs) fittings shall be compatible with the cleaning agents used on the vessels and piping to which they are attached. Tank lining shall be in accordance with Section 4104.1.2.6.

4103.6.13 Limit controls.

Limit controls shall be provided in accordance with Sections 4103.6.13.1 through 4103.6.13.3.

4103.6.13.1 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.

4103.6.13.2 High-liquid-level control.

Stationary tanks and process vessels with Class 1 Liquids having a capacity greater than 500 gallons (1893 L) shall be equipped with a device or other means to prevent overflow into the building including, but not limited to a float valve, preset meter on the fill line, valve actuated by the weight of the tank's contents, low-head pump incapable of producing overflow, or a liquid-tight overflow pipe at least one pipe size larger than the fill pipe and discharging by gravity back to an approved location.

Exception: Liquid-level sight gauges or other manual means approved by the fire code official to determine fill level are permitted in ABPFs where the use area or storage area is small enough that the stationary tank or process vessel is effectively under constant observation during filling operations.

4103.6.13.3 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.

4103.6.14 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.

22 SECTION 4104 EQUIPMENT

4104.1 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 4104.1.1 through 4104.1.4.4.2.

4104.1.1 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 4104.1.1.1 through 3804.1.1.7, Section 5703.6, as amended, and ASME B31. The use

of other standards is permitted when approved.

4104.1.1.1 Component design and construction.

Piping, tubing, hoses, valves, fittings, and related components conveying Class 1 Liquids shall be in accordance with the following:

- a. 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.
- b. Piping, tubing, hoses, valves, pumps, fittings and related components used in liquid transfer operations shall be approved or listed for the intended use.
- c. Where provided, in-line flame arresters in piping systems shall be installed and maintained in accordance with their listing or API 2028.
- d. Where Class 1 Liquids are carried in piping pressurized above 15 pounds per square inch gauge (psig; 103 kPa), an approved means of leak detection shall be provided.
Exception: Piping for overpressure relief devices.

4104.1.1.2 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:

- a. Draining spilled liquid away from the piping support system at a minimum slope of not less than 2 percent.
- b. Providing protection with a fire-resistance rating of not less than 2 hours; or
- c. Other approved methods.

4104.1.1.3 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.

4104.1.1.4 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:

- a. 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.
- b. Manual emergency shutoff valves and controls for remotely activated emergency shutoff valves shall be clearly visible and readily accessible. Information signage in accordance with IBC Section 4103.6.8 shall be provided identifying the emergency shutoff valves and controls.
- c. Backflow prevention or check valves shall be provided when backflow could create a hazardous condition or cause an unauthorized discharge.

4104.1.1.5 Pumps.

Solid or liquid fueled pumps are not permitted in Class 1 Liquid use areas or storage areas.

Exception: Fire pumps separated from the Class 1 Liquid use areas and storage areas by 2-hour fire-resistance rated fire barriers in accordance with IBC Section 707.

Positive-displacement pumps shall be provided with pressure relief discharging back to the vessel, pump suction or other approved location, or shall be provided with interlocks to prevent over-pressure.

4104.1.1.6 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.

4104.1.1.7 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.

4104.1.2 Vessels.

The design and construction of vessels used in ABPFs for Class 1 Liquids shall comply with the applicable Sections 4104.1.2.1 through 4104.1.2.13.4 and NFPA 30 or shall be of an approved type. Pressure vessels shall comply with the ASME Boiler and Pressure Vessel Code.

4104.1.2.1 Underground storage of Class 1 Liquids.

Underground storage of Class I liquids in tanks shall comply with Chapters 50 and 57, as amended. Vaults shall be in accordance with Chapter 57, as amended.

Underground storage of Class I liquids in other vessels is prohibited.

4104.1.2.2 Outdoor storage of Class 1 Liquids.

Outdoor storage shall be in accordance with Chapters 50 and 57, as amended.

4104.1.2.3 Tank vehicles and tank cars.

Tank vehicles and tank cars shall not be used as storage or processing vessels.

4104.1.2.4 Design of supports.

The supporting structure for stationary tanks and portable tanks with capacity greater than 660 gallon (2498 L) shall be designed in accordance with the International Building Code and NFPA 30.

4104.1.2.5 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.

4104.1.2.6 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.

4104.1.2.7 Manual drainage.

Manual drainage control valves shall be provided on stationary tanks and portable tanks with capacity greater than 660 gallon (2498 L). Manual drainage control valves on stationary tanks shall be located at approved locations remote from the tanks to ensure their operation in a fire condition.

4104.1.2.8 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.

4104.1.2.9 Materials used in tank construction.

The materials used in tank construction shall be in accordance with NFPA 30.

4104.1.2.10 Separation between adjacent tanks.

The separation between stationary tanks containing Class 1 Liquids shall be in accordance with NFPA 30, Table 22.4.2.1.

Exceptions:

- 1) Where a group of no more than 4 stationary tanks are aligned in a single row, the minimum separation distance between tanks is permitted to be reduced to 18" (457 mm) provided no single tank is over 960 gallons (3634 L) and clear access of 3 feet (914 mm) is provided around the group.
- 2) Where stationary tanks are in the drainage path of Class 1 Liquids and are compacted in three or more rows or in an irregular pattern, the fire code official is authorized to require greater separation than specified in NFPA 30, Table 22.4.2.1 or other means to make tanks in the interior of the pattern accessible for emergency response including firefighting purposes.

4104.1.2.11 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.

4104.1.2.12 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 4104.1.2.12.1 through 3804.1.2.12.5 to relieve positive and negative pressures such as those created from filling and draining. Vent lines shall not be used for purposes other than venting unless approved.

4104.1.2.12.1 Installation of vent piping.

Vent pipes shall be designed, sized, constructed and installed in accordance with Sections 5703.6, as amended, 5704.2.7.3 and 5704.2.7.4. Vent pipes shall be installed to drain toward the tank without sags or traps in which liquid can collect. Vent pipes shall be protected from physical damage and vibration.

4104.1.2.12.2 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.

4104.1.2.12.3 Vent pipe outlets.

To facilitate atmospheric dispersion, vent outlets shall be located so vapors are released at a safe point outside of buildings, directed upward or horizontally away from adjacent walls so vapors will not be trapped by eaves or other obstructions. Vent outlets shall not be less than 12 feet (3658 mm) above the finished ground level and shall not be less than 5 feet (1524 mm) from building openings or lot lines of properties that can be built upon.

4104.1.2.12.4 Manifolding.

Subject to the approval of the fire code official, vent pipes are permitted to be manifolded only for special purposes such as vapor recovery, vapor conservation or air pollution control. Manifolded vent pipes shall be adequately sized to prevent system pressure limits from being exceeded when manifolded tanks are subject to the same fire exposure.

4104.1.2.12.5 Emergency venting.

Tanks shall be equipped with additional venting that will relieve rapid overpressure due to fire. Emergency vents shall not discharge inside buildings. The venting shall be installed and maintained in accordance with NFPA 30, 22.7.

4104.1.2.13 Vessel openings other than vents.

Vessel openings other than vents shall comply with Sections 4104.1.2.13.1 through 4104.1.2.13.4

4104.1.2.13.1 Filling and emptying connections.

Filling and emptying connections to stationary tanks shall be properly identified in accordance with Section 4103.6.8.

4104.1.2.13.2 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.

4104.1.2.13.3 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.

4104.1.2.13.4 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.

4104.1.3 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 International Building Code.

4104.1.4 Testing.

Equipment, devices and systems shall be tested in accordance with Sections 4104.1.4.1 through 4104.1.4.4.2.

4104.1.4.1 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.

4104.1.4.1.1 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.

4104.1.4.2 Tanks.

Prior to being placed into service, tanks shall be tested in accordance with NFPA 30, 21.5.

4104.1.4.3 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.

4104.1.4.4 Periodic testing.

Equipment and safety systems shall be periodically tested in accordance with Sections 4104.1.4.4.1 and 4104.1.4.4.2. 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 testcycle.
- 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.

4104.1.4.4.1 Equipment.

The following equipment shall be tested periodically:

- a. Piping
- b. Limit controls required by Section 4103.6.13

4104.1.4.4.1.1 Testing frequency.

The equipment listed in Section 4104.1.4.4.1 shall be tested at one of the frequencies listed below:

- a. Not less than annually.
- b. In accordance with the approved manufacturer's requirements.
- c. In accordance with approved recognized industry standards; or
- d. In accordance with an approved schedule.

4104.1.4.4.2 Safety systems.

Safety systems listed in Section 3804.1.4.3 shall be periodically tested in accordance with their design, installation and testing standards.

Emergency alarms and limit-control monitoring shall be tested as for fire alarm systems in accordance with NFPA 72.

4104.2 Storage and use areas.

Storage and process operations shall be in accordance with the Boulder County or Larimer County Building Code, the Town of Lyons Building Code and this Fire Code and Sections 4104.2.1 through 4104.2.3.3.

4104.2.1 Storage areas.

Storage of Class 1 Liquids shall be in accordance with Sections 4104.2.1.1 through 4104.2.1.4, Chapter 32, as amended, and NFPA 30.

4104.2.1.1 General.

Storage of vessels in closely packed piles, on pallets, in racks, or on shelves shall be in accordance with Sections 4104.2.1.1.1 through 4104.2.1.1.3.

4104.2.1.1.1 Basement storage.

Storage in excess of the MAQs is prohibited in basements.

4104.2.1.1.2 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.

4104.2.1.1.3 Shelf storage.

Shelving shall be of substantial construction and shall be braced and anchored in accordance with the seismic design requirements of the International Building Code for the seismic zone in which the ABPF is located. Shelving, chocks, scuff boards, floor overlay and similar installations shall be of noncombustible construction or of wood not less than a 1-inch (25 mm) nominal thickness; treatments, coatings and construction materials shall be compatible with ethanol. Shelves shall be provided with a lip or guard when used for the storage of individual containers or casks.

Exception: Storage in flammable liquid storage cabinets specifically designed for such use.

4104.2.1.1.4 Separation and aisles.

Aisles shall be provided in storage areas such that all storage vessels are located no more than 20 feet (6096 mm) horizontally from a main aisle or access aisle. Main aisles shall be a minimum of 8 feet (2438 mm) wide in high piled combustible storage areas and a minimum of 4 feet wide in non-high piled combustible storage areas. Access aisles shall be a minimum of 4 feet (1219 mm) wide in high piled combustible storage areas and a minimum of 44 inches (1118 mm) wide in non-high piled combustible storage areas.

Aisles utilized for manual stocking, separation between piles, separation between adjacent rows of racks, and separation between racks and adjacent pile storage shall be main aisles or access aisles. Aisles utilized for mechanical stocking shall be main aisles. All piles including palletized storage shall border a main aisle on a minimum of one side or end. Additional aisles shall be provided for access to doors, required windows and ventilation openings, standpipe connections, fire extinguishers, mechanical equipment and switches. Such aisles shall be a minimum of 3 feet (914 mm) in width. A single aisle is permitted to serve multiple functions provided its minimum width is the largest of the widths required

for the functions served.

4104.2.1.1.5 Material handling equipment.

Material handling equipment shall be suitable to manipulate vessels at the highest tier level.

4104.2.1.1.6 Housekeeping.

Storage shall be maintained in an orderly manner.

4104.2.1.1.7 Dunnage, scuff boards, floor overlay.

Dunnage, scuff boards, floor overlay and similar installations shall be of noncombustible construction or of wood not less than a 1-inch (25 mm) nominal thickness.

4104.2.1.1.8 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, as amended, are in conflict with those in Section 4104.2.1, the more restrictive shall govern.

4104.2.1.3 Pile storage.

Pile storage including palletized storage shall be in accordance with Sections 4104.2.1.3.1 through 4104.2.1.3.2.2.

4104.2.1.3.1 Stabilizing and supports.

Intermediate bulk containers, containers, and portable tanks shall be stored in accordance with NFPA 30. Horizontally oriented casks stored in piles shall be supported by stackable racks or cradles of substantial construction designed for that purpose. Lateral bracing shall be provided for horizontally oriented casks stored in piles where the height of the pile exceeds three times the least dimension of the base rack or cradle. Storage height of horizontally oriented casks in this configuration shall not exceed the lesser of the rack manufacturer's recommendations or industry standards.

Configurations are stable against overturning in accordance with the seismic design requirements of the International Building Code for the seismic zone in which the ABPF is located.

4104.2.1.3.2 Palletized storage.

Palletized storage shall be in accordance with Sections 4104.2.1.3.2.1 and 4104.2.1.3.2.2.

4104.2.1.3.2.1 Stabilizing and supports.

Casks stacked vertically for storage shall be separated by pallets or other dunnage that spreads the weight of the casks on the tier above over the casks on the tier below. A lower tier shall not have less than four casks and shall not have an empty cask when a tier above has a cask that is not empty. No more than two tiers of casks are permitted to be stacked vertically in this configuration.

Exceptions:

- 1) Where the collapse strength of the casks on the lowest tier is not exceeded, palletized storage of vertically oriented casks are permitted to be stacked to a height of four tiers where the casks are bound together in a square pattern groups of no less than four, by a steel band or other approved binding.
- 2) Where the collapse strength of the casks on the lowest tier is not exceeded, palletized

storage of vertically oriented casks are permitted to be stacked to a height of six tiers where the casks are bound together in a square pattern in groups of no less than nine, by a steel band or other approved binding.

- 3) Where the collapse strength of the casks on the lowest tier is not exceeded, an engineered overturning analysis shall be provided demonstrating stability in accordance with the seismic design requirements of the International Building Code for the seismic zone in which the ABPF is located for storage configurations other than permitted in Exceptions 1 and 2.

4104.2.1.3.2.2 Idle combustible pallets.

Storage of idle wood pallets shall be limited to a maximum pile size of 2,500 square feet (232 m²) and to a maximum storage height of 6 feet (1829 mm). Storage of idle plastic pallets shall be in accordance with Section 4106.4.1.1 and as limited by the capacity of the automatic sprinkler system in accordance with NFPA 13. Pallet storage shall be separated from liquid storage by aisles that are a minimum of 8 feet (2438 mm) wide.

4104.2.1.4 Portable tank, intermediate bulk container, and container storage.

Portable tanks and intermediate bulk containers stored over one tier in height shall be designed to nest securely without dunnage. Stacked containers shall be separated by pallets or dunnage to provide stability and to prevent excessive stress to container walls. The storage height and configuration shall be in accordance with NFPA 30.

4104.2.2 Grain storage.

Grain storage shall be in accordance with Section 4103.2.1.1.

4104.2.3 Use areas.

Use areas for Class 1 Liquids in amounts exceeding the MAQ shall be in accordance with Sections 4104.2.3.1 through 4104.2.3.3.

4104.2.3.1 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.

4104.2.3.2 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.

4104.2.3.3 Class 1 Liquid transfer.

Class 1 liquids shall be transferred by one of the following methods:

- a. From safety cans in accordance with NFPA 30.

- b. Through an approved closed piping system.
- c. From vessels by an approved pump taking suction through an opening in the top of the vessel.
- d. By gravity from a tank, intermediate bulk container, or container through an approved self-closing or automatic-closing valve.
- e. Approved engineered liquid transfer systems.

Exception: Liquids transferred into and from containers not exceeding a 5.3-gallon (20 L) capacity.

23 Section 5308 Carbon Dioxide (CO₂) gas enrichment systems using on-site supply tanks and/or cylinders in plant growing (husbandry) applications is added as follows:

5308.1 General.

Carbon dioxide enrichment systems with more than 100 pounds (45.4 kg) of carbon dioxide or any system using any amount of carbon dioxide (CO₂) below grade used in plant growing (husbandry) applications shall comply with Sections 5308.1 through 5308.8.

5308.2 Permits.

Permits shall be required in accordance with Sections 105 and in accordance with Fire District policy.

5308.3 Equipment.

The storage, use, and handling of carbon dioxide shall be in accordance with Chapter 53, as amended, and the applicable requirements of NFPA 55, Chapter 13. All equipment utilized in compressed gas systems shall be compatible with the intended gas and use.

5308.3.1 Containers, cylinders and tanks.

Gas storage containers, cylinders and tanks shall be designed, fabricated, tested and labeled with manufacturers' specifications and shall be maintained in accordance with the regulations of DOT 49 CFR, Parts 100-185 or the ASME Boiler and Pressure Vessel Code, Section VIII.

5308.3.1.1 Location.

Location of gas storage containers, cylinders and tanks, inside or outside the building, shall be at an approved location.

5308.3.1.2 Security.

Gas storage containers, cylinders and tanks shall be secured in an approved manner to prevent overturning. Containers, cylinders and tanks located outside shall be secured and safeguarded against tampering and protected from physical damage if exposed to vehicle traffic.

5308.3.1.3 Design and construction.

Bulk tank installations over 2,000 pounds will require an engineered foundation and construction permit in accordance with the Building Code.

5308.3.2 Piping systems.

Piping, tubing, fittings, valves and pressure regulating devices shall be designed and installed in accordance with approved standards and manufacturers' recommendations.

5308.3.2.1 Piping, tubing and hoses.

Piping, tubing and hose materials shall be compatible with carbon dioxide and rated for the temperatures and pressures encountered in the system. All hoses and tubing used in carbon dioxide service shall be designed for a bursting pressure of at least four times their design pressure. PVC/ABS and other types of rigid plastic piping are not approved materials. Acceptable piping for carbon dioxide shall be the following:

- a. Stainless steel A269 grade, which is either seamless or welded drawn over mandrel
- b. Copper K grade, hard drawn seamless
- c. Copper ACR grade (1/2 inch outside diameter or less) annealed seamless
- d. Plastic/polymer materials rated for use with carbon dioxide
- e. Additional approved piping, tubing and hoses found in the Compressed Gas Association (CGA) standards for carbon dioxide

5308.3.2.1.1 Support.

Gas piping shall not be attached or supported by any electrical light supports or wiring.

5308.3.2.1.2 Identification.

Markings for carbon dioxide (CO₂) piping systems shall consist of the content's name (carbon dioxide or 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.

5308.3.2.2 Fittings, joints and connections.

Fittings, joints and connections shall be subject to the approval of the fire and building code officials.

5308.3.2.2.1 Fittings and joints between gas supply containers and automatic shutoff valve.

Joints and fittings on the supply piping or tubing between the CO₂ supply source and the automatic system shutoff valve shall be threaded, compression or welded.

5308.3.2.2.2 Unused connections.

Unused piping or tubing connected to the supply system shall be capped or plugged. A closed valve will not be allowed in lieu of a cap or plug.

5308.3.2.2.3 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.

5308.3.2.3 Valves.

Piping systems shall be provided with valves in accordance with Sections 5307.3.2.3.1 through 5307.3.2.3.4.

5308.3.2.3.1 Pressure relief valves.

Pressure relief valves shall be provided and piped to the outdoors.

5308.3.2.3.2 System shutoff valve.

An automatic system shutoff valve shall be provided as near to the supply pressure regulator as possible and shall be designed to fail to a closed condition 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 carbon dioxide (CO₂) will not interfere with the operation of the device.

5308.3.2.3.3 Appliance shutoff valves.

Each appliance shall be provided with a shutoff valve within 3 feet of the appliance. All shutoff valves shall be capable of being locked or tagged in the closed position for servicing.

5308.3.2.3.4 Accessibility and identification.

Valves and controls shall be readily accessible at all times. Normal and emergency system shut-off valves shall be clearly identified. All valves shall be designed or marked to indicate clearly whether it is open or closed.

5308.3.3 Venting.

Venting of gases shall be directed to an approved location outside the building. Insulated liquid carbon dioxide systems shall have pressure relief devices vented in accordance with NFPA 55.

5308.4 Protection from damage.

Carbon dioxide systems shall be installed so the storage tanks, cylinders, piping and fittings are protected from damage by occupants or equipment during normal facility operations.

5308.5 Required protection.

Where carbon dioxide storage tanks, cylinders, piping and equipment are located indoors,

rooms or areas containing carbon dioxide storage tanks, cylinders, piping and fittings and grow room/areas where carbon dioxide is released and can collect shall be provided with an emergency alarm system in accordance with Section 5310.5.1.

5308.5.1 Emergency alarm system.

An emergency alarm system shall comply with all of the following:

- a. Continuous gas detection shall be provided to monitor areas where carbon dioxide (CO₂) can accumulate. Detection equipment shall be provided to indicate carbon dioxide (CO₂) levels in each grow cultivation area/room and interior carbon dioxide (CO₂) storage location.
- b. Detectors shall be:
 - 1) listed or approved devices
 - 2) permanently mounted.
 - 3) installed at a height of no more than 48 inches above the floor or as approved by the fire code official.
 - 4) directly connected to building electrical supply and or fire alarm systems and protected from accidental disconnection or damage.
 - 5) auto calibrating and self “zeroing” devices are not permitted unless they can be zeroed and spanned.
 - 6) located within manufacturers specified detection range for each point of use and storage location.
- c. Activation of the emergency alarm system shall initiate amber strobes and audible horns provided in the vicinity of each interior storage container, cylinder or tank and at each point of release. Additional amber strobes and audible horns shall be placed at the entrances to below grade locations and confined spaces. The notification devices shall be rated a minimum of 80cd for a visible effect and 75 dBA for an audible effect and shall be mounted in accordance with NFPA 72 requirements. Provide audible visual devices at the following locations:
 - 1) Inside an interior storage room/area and outside the room/area at each entrance.
 - 2) Inside grow cultivation room/areas.
- d. Local alarm set points shall be set at:
 - 1) 5,000 PPM – Latching Alarm
 - 2) Visual and audible notification in approved locations at room or area in alarm
 - 3) Activation of automatic system shut off valve
 - 4) Evacuate the room in alarm and contact a qualified service company to investigate and address the condition.
 - 5) Reset of the emergency alarm to be conducted by qualified personnel.
- e. Signage shall be required adjacent to each horn/strobe as follows.
 - 1) Storage area/room: “DO NOT ENTER WHEN LIGHT IS FLASHING - CARBON DIOXIDE LEAK DETECTED”
 - 2) Grow cultivation room/area dispensing: “FLASHING LIGHT MEANS CARBON DIOXIDE LEAK DETECTED – EVACUATE ROOM”
 - 3) 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.

4) 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.

f. A minimum of one portable carbon dioxide (CO₂) meter shall be in use during business hours.

5308.6 Transfilling.

Filling and transfilling of gases between storage containers, cylinders and tanks and delivery vehicles shall be performed by qualified personnel using equipment and operating procedures in accordance with CGA P-1. Interior storage containers, cylinders and tanks shall be filled via remote fill ports on the exterior of the building at grade level. Exterior remote fill ports shall be fitted with a vent line to the outside. Delivery personnel shall have access to interior storage areas to inspect valves and piping prior to initiating filling operations.

5308.7 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.

5308.7.1 Records.

A written record of all required inspections, testing, calibration, and maintenance shall be maintained in a logbook on the premises containing the three (3) most current years of records and be available for review by fire inspection personnel.

5308.7.2 Required inspections and testing.

All piping installations shall be tested and inspected in accordance with Sections 5308.7.2.1 through 5308.7.2.5.

5308.7.2.1 Acceptance testing.

Appliances and equipment shall not be placed in operation until after the piping system has been checked for leakage and detectors, 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% of the operating pressure. Joints shall be checked with a bubble-forming solution. Acceptance testing is required to be witnessed by fire and/or building code officials. Provide an inspection report to the fire and/or building officials for the piping and joint visual inspection and

pressure test.

5308.7.2.2 Daily inspections.

All detectors and alarms shall be visibly inspected daily. These inspections are permitted to be conducted by trained employees.

5308.7.2.3 Monthly inspections.

All storage vessels, piping, and appurtenances shall be visibly inspected monthly. These inspections are permitted to be conducted by trained employees.

5308.7.2.4 Semi-annual inspections.

Systems shall be visually inspected, gas detectors calibrated in accordance with manufacturer specification, alarms tested, and tested for leaks semi-annually by a qualified service company.

5308.7.2.5 Alterations and repair.

In the event alterations, repairs or additions are made, the affected piping shall be retested in accordance with Section 5310.7.2.1.

5308.7.3 Reserved.

5308.7.4 Calibration.

Detectors shall be checked for accuracy, calibrated to a reference gas concentration, and span reset.

5308.7.5 Pressure testing.

Pipe joints shall be exposed for examination during the test.

5308.7.5.1 Test medium.

The test medium shall be air, nitrogen, carbon dioxide, or an inert gas.

5308.7.5.2 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.

5308.7.5.3 Regulators and valve assemblies.

Regulator and valve assemblies fabricated independently of the piping systems in which they are to be installed shall be permitted to be tested with inert gas or air at the time of fabrication. Test records shall be maintained in accordance with Section 5310.7.1.

5308.7.5.4 Test preparation.

All joints and fittings shall be exposed for examination during and after the test.

5308.7.5.4.1 Pipe clearing.

Prior to testing, the interior of the pipe shall be cleared of all foreign material.

5308.7.5.4.2 Appliance and equipment isolation.

Appliances and equipment that are not to be included in the test shall be isolated from the piping by closing the appliance shutoff valve.

5308.7.5.4.3 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.

5308.7.5.4.4 Test pressure.

The test pressures shall be as specified in Section 5310.7.2.1. Where the test pressure exceeds 125 psig (862 kPa gauge), the test pressure shall not exceed a value that produces a hoop stress in the piping greater than 50 percent of the specified minimum yield strength of the pipe or tubing. Pressures shall be adjusted smoothly and slowly to avoid pressure spikes.

5308.7.5.5 Test duration.

The test duration shall be not less than 10 minutes.

5308.7.5.6 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.

5308.7.5.7 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.

5308.7.5.8 Corrections.

Where leakage or other defects are located, the affected portion of the piping system shall be repaired or replaced and retested.

5308.8 Training.

All employees shall receive annual training in hazard identification, physical properties, inspections, and emergency procedures. Training records shall be maintained on site and be available to inspectors upon request.

24 SECTION 5309 CARBON DIOXIDE (CO₂) GAS ENRICHMENT SYSTEMS USING A NATURAL GAS BURNER IN PLANT GROWING (HUSBANDRY) APPLICATIONS

is added as follows:

5309.1 General.

Natural gas burners that are utilized to generate carbon dioxide (CO₂) in plant growing (husbandry) applications shall comply with Sections 5309.2 through 5309.6. A mechanical exhaust system shall be provided as required by the International Mechanical Code.

5309.2 Permits.

Permits shall be required in accordance with Section 105 and in accordance with Fire District policy.

5309.3 Equipment.

Natural gas burners shall be listed, labeled and installed in accordance with the manufacturer's installation instructions. Piping systems, combustion and ventilation air and venting for natural gas appliances shall be designed and installed in accordance with approved standards, the International Fuel Gas Code and manufacturer's recommendations.

5309.4 Required protection.

Where natural gas burners are located indoors for carbon dioxide (CO₂) enrichment, grow room/areas shall be provided with an emergency alarm system in accordance with Section 5309.4.1 and carbon monoxide detection in accordance with Section 5309.4.2.

5309.4.1 Emergency alarm system.

An emergency alarm system shall comply with all of the following:

- a. Continuous gas detection shall be provided to monitor areas where carbon dioxide (CO₂) can accumulate. Detection equipment shall be provided to indicate carbon dioxide (CO₂) levels in each grow cultivation area/room.
- b. Detectors shall be:
 - i. Listed or approved devices
 - ii. permanently mounted.
 - iii. installed at a height of no more than 48 inches above the floor or as approved by the fire code official.
 - iv. directly connected to building electrical supply and or fire alarm systems and protected from accidental disconnection or damage.
 - v. auto calibrating and self “zeroing” devices are not permitted unless they can be zeroed and spanned.
 - vi. located within manufacturer’s specified detection range for each point of release
- c. Activation of the emergency alarm system shall initiate amber strobes and audible horns provided in each room/area where carbon dioxide (CO₂) can accumulate. Additional amber strobes and audible horns shall be placed at the entrances to below grade locations. The notification devices shall be rated a minimum of 80cd for a visible effect and 75 dBA for an audible effect and shall be mounted in accordance with NFPA 72 requirements. Provide notification devices at the following locations: Inside grow cultivation room/areas.
- d. Local alarm set points shall be set at: 5,000 PPM – Latching Alarm
 - i. Visual and audible notification in approved locations at room or area in alarm
 - ii. Activation of the automatic natural gas control valves to each burner to a closed position stopping the generation of carbon dioxide (CO₂)
 - iii. Evacuate the room in alarm and contact a qualified service company.
 - iv. Reset of emergency alarm to be conducted by qualified personnel.
- e. Signage will be required adjacent to each horn/strobe as follows:
 - i. *Entrance to below grade location:* “DO NOT ENTER WHENLIGHT IS FLASHING – CARBON DIOXIDE LEAK DETECTED”
 - ii. *Grow cultivation room/area dispensing:* “FLASHING LIGHT MEANS CARBON DIOXIDE LEAK DETECTED – EVACUATE ROOM”
 - iii. 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.
 - iv. *Signage at entrance doors:* Signage shall be provided at entrance doors to each grow cultivation room/area:



NFPA 704 placards for simple asphyxiants shall also be provided at the exterior main entrance.

- f. All carbon dioxide (CO₂) burner systems shall shut down in the event of a loss of electrical power to the carbon dioxide (CO₂) detectors.
- g. A minimum of one (1) portable carbon dioxide (CO₂) meter shall be in use during business hours.

5309.4.2 Carbon monoxide (CO) detection.

- a. Carbon monoxide (CO) gas detection shall be provided to monitor products of combustion continuously.
- b. Detectors shall be:
 - 1) listed or approved devices
 - 2) permanently mounted
 - 3) Installed per manufacturer's recommendations and directions
 - 4) directly connected to building electrical supply and fire alarm systems and protected from accidental disconnection or damage
- c. CO detection shall be set at 35 PPM and upon activation shall initiate the following:
 - 1) Close the automatic valve to each burner
 - 2) Activate the mechanical exhaust system
- d. All carbon dioxide (CO₂) burner systems shall shut down in the event of a loss of electrical power to the carbon monoxide (CO) detectors.
- e. A minimum of one (1) portable carbon monoxide (CO) meter shall be in use during business hours.

5309.5 Inspection and testing.

All detectors, alarms and carbon dioxide (CO₂) burners must be visually inspected, calibrated, and tested to determine that the materials, design, fabrication and installation practices comply with the requirements of this code.

5309.5.1 Records.

A written record of all required inspections, testing, calibration, and maintenance shall be maintained in a logbook on the premises containing the three (3) most current years of records and be available for review by Fire District inspection personnel.

5309.5.2 Required inspections and testing.

All detectors, alarms and carbon dioxide (CO₂) burner equipment shall be tested and inspected in accordance with Sections 5309.5.2.1 through 5309.5.2.6.

5309.5.2.1 Acceptance testing.

Appliances and equipment shall not be placed in operation until after the detectors,

notification devices, automatic gas control valves and mechanical exhaust system have been tested by a qualified service company. Acceptance testing is required to be witnessed by fire and building code officials.

5309.5.2.2 Daily inspections.

All detectors and alarms shall be visibly inspected daily. These inspections are permitted to be conducted by trained employees.

5309.5.2.3 Monthly inspections.

All carbon dioxide (CO₂) burners and appurtenances shall be visibly inspected monthly. These inspections are permitted to be conducted by trained employees.

5309.5.2.4 Semi-annual inspections.

Systems shall be visually inspected and gas detectors calibrated in accordance with manufacturer specification semi-annually by a qualified service company.

5309.5.2.5 Annual testing.

All detectors, alarms, gas control valves and mechanical exhaust systems shall be tested annually by a qualified service company.

5309.5.2.6 Alterations and repair.

In the event alterations, repairs or additions are made, the affected equipment shall be retested in accordance with Section 5309.5.2.1.

5309.5.3 Reserved

5309.5.4 Calibration.

Detectors shall be checked for accuracy, calibrated to a reference gas concentration, and span reset.

53109.6 Training.

All employees shall receive annual training in hazard identification, physical properties, inspections, and emergency procedures. Training records shall be maintained on site and be available to inspectors upon request

The following Appendix O is adopted in its entirety and incorporated into the Fire Code as if set forth in full therein

APPENDIX O

IGNITION SOURCE CONTROL

Open Burning Defined. “Open Burning” means fire that a person starts and that is intentionally used for forest or urban interface management.

Unless expressly exempted by State law, no person or entity shall conduct Open Burning on privately owned property within the Fire District’s jurisdictional boundaries, without first having obtained an Open Burn Permit from the appropriate County Sheriff’s Office. All permits must be approved by the Fire District. When existing codes and ordinances of Boulder County, Larimer County or the Town of Lyons are in conflict or are inconsistent with the provisions in this Appendix O, the most restrictive provision will apply for all Open Burning. In addition to current County and State requirements regarding Open Burning, the Fire District’s following requirements must be

complied with at all times to engage in Open Burning:

- Only clean and dry slash, forest debris, branches and trunks may be burned. No material greater than 6 inches in diameter may be burned.
- Piles shall be constructed on bare ground or sparse grass. Piles must be at least 50 ft. from structures and 30 ft. from other combustibles (fences, trees, etc.).
- Piles shall be no larger than 6 feet (ft.) wide, 6 ft. deep and 6 ft. in height. There must be a minimum of 12 inches of mineral soil around the pile. Mineral soil is soil that contains no plant (flammable) material.
- Open Burning is prohibited unless there is 5 inches of continuous snow cover on the ground for at least 30 ft. around the pile and winds do not exceed 10 miles per hour. The person responsible for the burning shall at all times during the burning have equipment that accurately measures wind speed.
- Pile burning shall be allowed no earlier than two hours after sunrise and be completed no later than two hours before sunset.
- Burning piles shall be attended at all times by a competent adult equipped with hand tools (e.g., shovel, hoe, garden rake) and water to extinguish unintended fire spread. Burn piles will be fully extinguished (cold to the touch) prior to leaving the area unattended.
- If at any time during the burning process winds exceed 10 miles per hour), the person attending the fire shall immediately take actions to completely extinguish the fire (cold to the touch).
- There shall be no Open Burning, including permitted Open Burning, during State or County authorized fire restrictions or bans.

ADOPTED and APPROVED this ____ day of March 2023.

LYONS FIRE PROTECTION DISTRICT

By: _____

ATTESTED:

By: _____