



Lake Havasu City Fire Department

Fire Prevention Bureau

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FD Specification #18

2018 IFC, Ch. 53 / NFPA 55, CH. 13

Rev. 9/01/2021

Insulated Liquid Carbon Dioxide Systems Used in Beverage Dispensing Application

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PURPOSE:

To provide policy requirements for safeguarding workers, patrons and emergency responders where carbon dioxide systems are used in beverage dispensing applications.

SCOPE:

This fire department specification regulates CO2 systems with more than 100 pounds of CO2 used in beverage dispensing applications in new and upgraded installations.

DEFINITIONS:

1. **CARBON DIOXIDE (CO2).** A colorless, odorless, water soluble, heavier than air gas, or cryogenic liquid, which is classified as an asphyxiant where, in higher concentrations, it can cause injury or death when exposed.
2. **COMPRESSED GAS.** A material, or mixture of materials which is a gas at 68°F or less at 14.7 pounds per square inch absolute (psia) of pressure; and has a boiling point of 68°F or less at 14.7 psia which is either liquefied, non-liquefied or in solution, except those gases which have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia at 68°F.
3. **COMPRESSED GAS CONTAINER.** A pressure vessel designed to hold compressed gases at pressures greater than one atmosphere at 68°F and includes cylinders, containers, and tanks.
4. **COMPRESSED GAS SYSTEM.** An assembly of equipment designed to contain, distribute, or transport compressed gases. It can consist of a compressed gas container or containers, reactors and appurtenances, including pumps, compressors and connecting piping and tubing.
5. **GAS DETECTION SYSTEM.** A system or portion of a combination system that utilizes one or more stationary sensors to detect the presence of a specified gas at a specified concentration and initiate one or more responses required by this code, such as notifying a responsible person, activating an alarm signal, or activating or deactivating equipment. **NOTE:** A self-contained gas detection and alarm device is not classified as a gas detection system.

PERMITS:

1. A fire department construction permit is required to install, repair damage to, abandon, remove, place temporarily out of service, close or substantially modify a compressed CO2 gas system using with more than 100 pounds of carbon dioxide used in beverage dispensing applications.
2. A fire department operational permit is not required at this time but may be required in the future.

REQUIREMENTS:

1. **General.** Containers, cylinders and tanks must comply with all relevant provisions of IFC Ch. 53 and must be tested designed, fabricated, tested, marked with the specifications of the manufacturer and maintained in accordance with the regulations of DOT 49 CFR Parts 100-185 or the ASME Boiler and Pressure Vessel Code, § VIII.
2. **Equipment.** The storage, use, and handling of liquid CO2 must be in accordance with this specification and applicable requirements of NFPA 55, Ch. 13. Insulated liquid CO2 systems must have pressure relief devices vented in accordance with NFPA 55.
3. **Protection from damage.** CO2 systems must be installed so the storage tanks, cylinders, piping and fittings are protected from damage by occupants or equipment during normal facility operations.
4. **Required protection.** Where CO2 storage tanks, cylinders, piping, and equipment are located indoors, rooms or areas containing CO2 storage tanks, cylinders, piping and fittings and other areas where a leak of CO2 can collect must be provided with either ventilation in accordance with an approved mechanical ventilation system or an emergency alarm system in accordance with this specification.
5. **Ventilation.** Except where an approved gas detection system is installed, mechanical ventilation must be provided in accordance with the *International Mechanical Code* and comply with all of the following:
 - a. Mechanical ventilation in the room or area must be at a rate of not less than 1 cubic foot per minute per square foot over the storage area and designed to operate at a negative pressure in relation to the surrounding area.
 - b. 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.**
 - c. Exhaust must be taken from a point within 12 inches of the floor.
 - d. The location of both the exhaust and inlet air openings shall be designed to provide air movement across all portions of the floor or room to prevent the accumulation of vapors.
 - e. Exhaust air shall not be recirculated to occupied areas.

Gas Detection/Alarm System: Where ventilation is not provided, a gas detection system shall be provided in rooms or indoor areas and in below-grade outdoor locations with insulated CO2 systems. CO2 sensors shall be provided within 12 inches of the floor in the area where the gas is expected to accumulate or other approved locations.

The system shall be designed as follows:

1. Activates an audible and visible supervisory alarm at a normally attended location upon detection of a CO2 concentration of 5,000 ppm.
2. Activates an audible and visible alarm within the room or immediate area where the system is installed upon detection of a CO2 concentration of 30,000 ppm

REFERENCES:

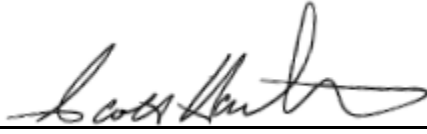
2018 International Fire Code (IFC) Ch. 53 *Compressed Gases*

2016 NFPA 55: *Compressed Gases and Cryogenic Fluids Code*, Chapter 13 *Insulated Liquid Carbon Dioxide Systems*

2018 International Mechanical Code

Note: This FD specification is intended to be a guide only. For full installation, fire-flow, location, distribution, and maintenance requirements, refer to the references above. Where conflicts exist between this document and the applicable codes and standards, the above references must supersede.

APPROVED: _____



Scott Hartman, Fire Marshal

DATE: September 01, 2021