



Bulk Liquid Carbon Dioxide (CO₂) Systems

October 2019



The use of Carbon Dioxide (CO₂) as an additive in beverages dates back to 1767. In many drinking and dining establishments, Carbon Dioxide has been added to flavored water on site, delivered from pressurized containers.

For high-volume establishments, this has meant the carbon dioxide containers must be replaced frequently.

In response, industry has been providing containers of liquid Carbon Dioxide which provide significantly higher volume of CO₂ in essentially the same size or smaller container. Instead of changing the containers daily, they can be changed out weekly or even at longer frequencies.

Fire District 7 has experienced multiple incidents of leaking bulk CO₂ systems within Snohomish County. The result is a potentially lethal environment. The Phoenix, AZ Fire Department put together a video about leaking carbon dioxide in the basement of the restaurant creating an oxygen deficient atmosphere that was nearly lethal to restaurant employees and responding firefighters. View at this link https://www.youtube.com/watch?v=eY_H-CMvw0

The 2015 International Fire Code contains requirements for CO₂



systems, using more than 100 lbs of carbon dioxide. The following apply to both new and existing systems:

1. A Fire Construction Permit is required for existing (one time) and new systems
2. After the construction permit is completed an annual Operational Fire Permit is required
3. Pressure relief valves vented to the exterior of the building are required on insulated liquid CO₂ systems
4. Storage tanks, cylinders, piping, and fittings must be protected from damage by occupants and equipment

5. When systems (tanks, cylinders, piping and/ or equipment) are located indoors:

Continuous mechanical ventilation not less than 1 cfm/sf is recommended

- Exhaust taken from a point within 12" of the floor
- Ventilation designed to operate at a negative pressure in relation to the surrounding area

6. Gas detection & alarm system is required

- Continuous gas detection to monitor areas where carbon dioxide can accumulate
- Threshold for alarm activation not to exceed 5,000 parts per million
- Activation of the alarm shall initiate a local alarm within the room or area where the system is installed

7. A warning sign shall be posted at the entrance to the building, room, enclosure, or confined area where the container is located. The warning sign shall be at least 8 inches wide and 6 inches high and state the following:

CAUTION — CARBON DIOXIDE GAS.

Ventilate the area before entering. A high carbon dioxide (CO₂) gas concentration in this area can cause suffocation.

Example:

CAUTION

CARBON DIOXIDE GAS

Ventilate the area before entering.
A high carbon dioxide (CO₂) gas concentration in this area can cause suffocation.

8. If you have any questions please call 360-805-0338 and select Option 5 or email: riskreduction@snofire7.org

For additional information:

- International Fire Code (2015) Section 5307
- National Fire Protection Association Standard 55, Chapter 13
- Compressed Gas Association Safety Alert SA-22 2011
- Washington State Building Code Council Interpretation 17-11

