

City of Vista Fire Department

Development Services Section
200 Civic Center Dr., Vista CA 92084

Guideline:

Compressed Gases



Guideline G-05

Date: January, 2008

Compressed Gas Guideline

PURPOSE

The intent of this guideline is to provide the information necessary to ensure that the design and installation of compressed gas containers, cylinders, tanks, and systems will comply with the applicable provisions of the 2007 California Fire Code (CFC) Articles 30, and CFC Standard 79-3, CFC Standard 80-2 and locally adopted ordinances enforced by the City of Vista.

SCOPE

This guideline is applicable to storage, use, and handling of compressed gases in compressed gas containers, cylinders, tanks, and systems. Partially full compressed gas containers, cylinders, or tanks containing residual gases shall be considered as full for the purpose of the controls required.

REQUIREMENTS

1. Permits are required by the California Fire Code, Section 105.6.8 to store, transport on site, dispense, use, or handle compressed gases in excess of the quantities specified in CFC:

TABLE 105.6.8– PERMIT AMOUNTS FOR COMPRESSED GASES

TYPE OF GAS	<u>AMOUNT (cubic feet)²</u> x0.0282 for m ³
Corrosive	200
Flammable (except cryogenic fluids and liquefied petroleum gases)	200
Highly toxic	any amount
Inert and simple asphyxiant	6,000
Oxidizing (including oxygen)	504
Pyrophoric	any amount
Toxic	any amount

2. Applicant shall furnish the required information prior delivery of compressed gas to the business. Initial permit issuance shall be treated as a tenant improvement and detailed plans shall be submitted to the Vista Building Department for review processing. Any changes in quantity of compressed gas, type of gas or change to a process shall be reviewed and approved by the Vista Fire Department, prior to any on-site changes. Plans shall include the following *minimum* details; additional details may be required by the Fire Department after initial review of the proposed use:

- A. A site plan on 8 ½" X 11" paper(s), which contains:
 - Floor plan of the building showing where gas is to be installed, distributed, or stored.
 - *Identification* of the type of gas, the *quantity* in cubic feet, and the type of storage containers
 - Adequate separation of incompatible products
 - The location of the storage containers
 - The piping design plan identifying routing of pipe and labeling of piping
 - Location of shut off valves and discharge points
 - Location and type of alarm system(s)
 - The storage room, including construction type, doors, and ventilation
 - Method of securing cylinders from accidental dislodgment or unauthorized access
3. When the amount of compressed gas exceeds 200 cubic feet per cumulated type of gas, a hazardous materials business emergency plan and chemical inventory disclosure shall be required, per Vista Municipal Code and California Code of Regulations.
4. Permits for the *use* of the compressed gas, i.e. hot works permit required by CFC 105 shall be issued separately from compressed gas permits.

General Requirements: (CFC Chapter 30)

1. Compressed gas cylinders shall be marked in accordance with nationally recognized standards. Compressed gas cylinders shall be clearly labeled with the name of the chemical. Piping systems shall be marked with the content's name and the direction of flow. Markings are required at each valve; at wall, floor or ceiling penetrations; at each change of direction; and at a minimum of every 20' or fraction thereof throughout the piping run.
2. Compressed gas containers, cylinders, and tanks shall be secured to prevent falling from contact, vibration, or seismic activity, by one of the following methods:
 - a. Securing one or more to a fixed object with one or more restraints
 - b. Securing containers on a cart or other mobile device designed for specific use
 - c. Nesting of cylinders at container filling or servicing facilities or in seller's warehouses which are not accessible to the public
 - d. Securing containers to or within a rack, framework, cabinet, or similar assembly designed for such use
3. Compressed gas container, cylinder, and tank valves shall be protected from physical damage by means of protective caps, collars, or similar devices. Devices shall be maintained in place and shall be attached.
4. Compressed gas containers, cylinders, tanks, and systems shall be separated from materials and conditions that present exposure hazards and from incompatible materials. Containers shall not be exposed to corrosive chemicals or fumes, which could damage containers and/or valves.

5. Combustible waste, vegetation, and similar materials shall be kept a minimum of 10' from containers, cylinders, tanks, and systems.
6. Compressed gas containers, cylinders, and tanks shall not be placed near elevators or unprotected platform ledges where they may fall. Cylinders shall not be placed in areas where they are likely to be damaged from falling objects.
7. Compressed gas containers, cylinders, and tanks shall not be exposed to temperatures exceeding 125° F, or sub ambient temperatures, unless by approved method and trained personnel. Devices designed to maintain containers at constant temperature shall be approved and be designed to be failsafe. When cylinders are stored where extreme temperatures prevail, overhead covers shall be provided.
8. To prevent bottom corrosion, containers, cylinders, and tanks are to be protected from direct contact with soil or unimproved surfaces. The area where cylinders are located shall be graded to prevent accumulation of water.
9. Leaking, damaged or corroded containers, cylinders and tanks are to be removed from service and handled in an approved manner. Containers that have been exposed to fire shall also be removed from service and handled by approved qualified persons.
10. Systems, containers, cylinders, tanks, piping, tubing, valves, fittings, and related components shall be designed and constructed in accordance with nationally recognized standards, and shall be of an approved type.
11. Piping, tubing, valves, fittings, and related components shall be fabricated from materials compatible with the material to be contained, and of adequate strength and durability to withstand the pressure, structural and seismic stress, and exposure to which they are subject.
12. Emergency shut-off valves shall be identified and location shall be clearly visible and indicated by means of a sign.
13. Areas for the storage, use, and handling of compressed containers, cylinders, tanks, and systems shall be safeguarded from unauthorized entry and secured with such protective facilities as public safety requires.
14. Emergency shutoff for flammable, oxidizing and pyrophoric gases shall be provided at each point of use and at each source.

Storage: (CFC 3004)

1. Compressed gas containers, cylinders, and tanks shall be maintained in an upright, “valve end up” position, unless designed for use in a horizontal position.
Exception: containers with a water volume of less than 1.3 gallons are allowed to be stored in the horizontal position.

At cylinder filling operations and seller’s warehouses, tightly stacked horizontal storage is considered an equivalent safe method of storage.

2. Additional material specific requirements shall comply with CFC 2007 for the following classifications of compressed gases:
 - a. Toxic and Highly Toxic compressed gases
 - b. Flammable gases
 - c. Oxidizing gases
 - d. Pyrophoric gases
 - e. Unstable (reactive) gases
 - f. Radioactive gases
 - g. Corrosive gases

See CFC Chapters 31, 35, 37 and 44 for requirements pertaining to material specific provisions.

Use and Handling: (CFC 3005)

1. Compressed gas systems shall be suitable for the use intended and shall be designed by persons competent in such design. Nationally recognized standards and practices shall be followed.
2. Automatic controls shall be designed to be failsafe and shall prevent the gas from entering or leaving piping systems at other than the intended time, rate, or path.
3. Piping, tubing, pressure regulators, valves, and other apparatus shall be kept gas-tight to prevent leakage.
4. Venting shall be in accordance with the Mechanical Code and shall be to an approved location.
5. Liquefied gas containers, cylinders, tanks, and all compressed gas containers, cylinders, and tanks shall be used in a “valve upright” position. An upright position shall include conditions where the container is inclined as much as 45 degrees from vertical.
6. Gases used for inflatable equipment, devices, or balloons shall be inert or shall be compressed air.
7. Handling of containers, tanks, and cylinders shall be by approved method, including hand cart, hand truck, or other mobile devices designed for the secure movement of containers. Ropes, chains, or slings shall be used to suspend containers, cylinders or tanks, unless the manufacturer has provided appropriate lifting attachments such as lugs.

8. Additional material specific requirements shall comply with CFC 2007 for the following classifications of compressed gases:
 - a. Toxic and Highly Toxic compressed gases
 - b. Flammable gases
 - c. Oxidizing gases
 - d. Pyrophoric gases

Medical Gas Systems (CFC 3006)

1. Compressed gases at hospitals and similar facilities intended for inhalation or sedation, including, but not limited to, analgesia systems for dentistry, podiatry, veterinary, and similar uses shall be in accordance with the following additional requirements and the provisions listed above.
2. Medical gases shall be stored in areas dedicated to the storage of such gases, and without any other storage or use. When quantities are greater than the permit amount from Table 105.6.8, the cylinders, containers or tanks shall be in one of the following:
 - a. One-hour exterior room
 - b. One-hour interior room
 - c. Gas cabinet
3. The following construction provisions for storage of medical gases in quantities exceeding exempt amounts shall apply:
 - a. One-hour exterior room, including openings between the room or enclosure and interior spaces to be self-closing smoke and draft control assemblies having a 1 hour rating. Rooms shall have at least one exterior wall, which contains at least two vents. Each vent shall not be less than 36 square inches; one shall be within 6" of the floor and the other within 6" of the ceiling. Containers of medical gases shall be provided with at least one fire sprinkler to provide cooling in case of fire.
 - b. One-hour interior rooms without any exterior walls shall be provided with automatic fire sprinklers. The room shall be exhausted through a duct to the exterior. Makeup air to the room shall be taken from the exterior. Both air streams shall be enclosed in a one-hour rated shaft from the room to the exterior. Approved mechanical ventilation shall be in accordance with the Mechanical Code.
 - c. Gas cabinets shall operate at a negative pressure in relation to surrounding area. Gas cabinets shall be provided with self-closing limited-access ports, connected to an exhaust system, provided with a self-closing door and constructed of not less than 0.097-inch (12 gage) steel, and shall be internally sprinklered.