

Oxygen Cylinder Storage Requirements

Information is based on the National Fire Protection Association, Standard 99 (NFPA 99), Health Care Facilities Code

Oxygen cylinders are supply tanks that contain oxygen at pressures that can be in excess of 2000 psi (pounds per square inch). Two types of hazards associated with oxygen are:

- 1) General fires and explosions enhanced by oxygen-rich atmospheres
- 2) Mechanical problems such as physical damage to compressed gas cylinders

A common hazard in a health care facility is storing and handling compressed oxygen in cylinders. NFPA 99, Health Care Facilities Code minimizes these hazards by defining optimum design and construction of cylinder storage locations as well as safe operation and handling of the cylinders.

As more oxygen is stored in cylinders, the hazard increases. Current codes break storage down to 3 categories:

1. Storing up to 300 cubic feet of oxygen

- Volumes less than 300 ft³ of oxygen may be stored per smoke compartment in any room or alcove without special requirements for that room
 - Cylinders must be secured (chains or racks) to prevent them from falling over

2. Storing between 300 and 3,000 cubic feet

- Volumes between 300 ft³ and 3000 ft³ of oxygen must be stored in special designated rooms that meet the following requirements:
 - Rooms must be non-combustible or limited-combustible construction (gypsum wallboard, tiled walls, etc.) with a door that can be secured from unauthorized entry (i.e. Locked)
 - Oxygen may not be stored with other flammable gases or liquids
 - Oxygen cylinders must maintain a minimum distance of 20 ft. from combustibles (5 ft. if room is sprinklered), or placed within an enclosed cabinet having a fire rating of at least ½ hour.
 - Cylinders must be secured in racks or by chains

3. Storing over 3,000 cubic feet of oxygen

- Volumes of 3000 ft³ and over of oxygen must be stored in special designated rooms that meet the following requirements (storing oxygen in these volumes will require a backup power system and engineer designed ventilation system):
 - Sufficient room to maneuver cylinders
 - Room able to be secured with lockable doors
 - Interior room must be constructed with non-combustible or limited-combustible construction with a minimum fire rating of 1-hour (no allowances for fully sprinklered rooms)
 - Be compliant with NFPA 70 National Electric Code with electrical devices protected/located at or above 5ft above finished floor
 - Be heated by indirect means if heat is required
 - Be provided with adequate amounts of racks (constructed of non-combustible or limited-combustible materials) and chains to secure all cylinders, full or empty
 - A dedicated, continuous-operating mechanical ventilation system that draws air from within 12 inches of the floor, with a means of make-up air provided

- Where natural ventilation is permitted, it shall consist of two louvered openings, each having a minimum free area of 72 in² with one located 12 inches from the floor and one located 12 inches from the Ceiling. NOTE: Louvered natural ventilation openings are not permitted in an exit access corridor.

TRANSFILLING

When a facility uses large containers of liquid oxygen to fill empty portable liquid oxygen containers, this process is called, transfilling.

When transfilling activities take place in a facility, the following items must be met to protect staff and residents from the dangers of liquid oxygen:

- The room must be separated by a fire barrier of 1 hour fire resistive construction
- The area must be mechanically ventilated (negative pressure), sprinklered and have ceramic or concrete flooring
- The room must be posted with signs indicating that transfilling is occurring and that smoking in the immediate area is not permitted
- The individual transfilling must be properly trained in transfilling procedures

TYPICAL CYLINDER CAPACITY:

A cylinder: 4 cubic feet

D cylinder: 15 cubic feet

G cylinder: 254 cubic feet

B cylinder: 6 cubic feet

E cylinder: 24 cubic feet

H or K cylinder: 250 cubic feet

C cylinder: 9 cubic feet

M cylinder: 122 cubic feet

DEFINITIONS:

Medical gas cylinders are considered to be “in use” and not counted as in storage if they are.

- Actually being used by a patient
- Secured to equipment to be ready for immediate use (like gurneys or crash carts)
- Placed in a patient room for immediate patient use

Minnesota Department of Health
 Engineering Services Section
 P.O. Box 64900
 St. Paul, Minnesota 55164-0900
healthcareengineers@state.mn.us
www.health.state.mn.us

04/16/20

To obtain this information in a different format, call: 651-201-4229.