



FIRE PREVENTION DEPARTMENT

Storage & Handling of Medical Gas Cylinders

This SafetyNet addresses the hazards associated with compressed gas cylinder use and storage. Compressed gas cylinders store gas at very high pressure, up to 2,300 pounds per square inch. If a cylinder or cylinder valve is damaged by falling or by contact with other equipment, the cylinder could act like a projectile and fly through the air or spin in circles with great force until the pressure is exhausted. In addition to the high pressure hazard associated with all compressed gases, the physical properties of the gas within the cylinder may present a particular hazard. Flammable gases can be ignited by the smallest of ignition sources, oxidizing gases can cause ordinary combustible material or even ordinarily non-combustible material to burn hot and bright, and many gases can displace the oxygen in an enclosed space reducing the oxygen concentration below that needed to support human life.

UC Davis EH&S [Safety Net #60, Compressed Gas Safety](#), contains detailed requirements and safety information regarding the use, handling and storage of compressed gases and is a companion document to this SafetyNet. In addition to the requirements outlined in Safety Net #60, NFPA 101 (Life Safety Code) provides additional requirements for compressed gases used in hospitals and medical office buildings and is the basis for their Fire Net.

Definitions

- Smoke Compartment – The area of the floor or unit separated by a smoke barrier wall. Example: The fifth floor of the Davis Tower is divided into two smoke compartments.
- Immediate Use – The code considers an individual cylinder placed in a patient room for patient use to be immediate use. In addition, small cylinders attached to patient apparatus (beds, gurneys, transporters, etc.) to be considered immediate use.
- Gas Storage Room – A room constructed of non-combustible or limited combustible materials (concrete or sheet rock respectively for example) that is either partially or fully devoted for gas cylinder storage. In addition the room must have a sign (readable from five feet) identifying it as a gas storage room, including the following warning: Caution; Oxidizing Gas(es) Stored Within; No Smoking. In addition the NFPA 704 diamond must be installed.

Protection from Damage

Cylinders must never be left without some type of physical support or restraint such as a stand, a cart, or a cylinder storage rack.



Quantity Limitations

Gas cylinders are typically found in two sizes, H-Cylinders (large) and E-Cylinders (small). The capacity of an H-Cylinder is approximately 250 cubic feet, and the capacity of an E-Cylinder is approximately 25 cubic feet. *Compressed gas storage is limited in each smoke compartment based on many factors addressed in the Fire Code.*

1. *Immediate Use* – The Joint Commission considers a cylinder in immediate use if it is available to a patient at the bedside, properly secured on a gurney or in an operating room. Cylinders in immediate use are not included in the total amount allowed per smoke compartment limit.
 2. *Gas Storage Room* – A gas storage room is an enclosed room accessible only to staff and constructed of non-combustible or limited-combustible materials. Gas cylinders stored in a gas storage room are not included in the total amount allowed per smoke compartment limit. There are a number of parameters associated with a gas storage room (NFPA 99 section 9.4.2):
 1. A precautionary sign, readable from a distance of 5 feet, must be displayed on the storage room door. See Definitions section above for wording.
 2. Oxidizing gas cylinders must be maintained a minimum distance of 20 feet from combustible materials. The minimum distance to combustible material may be reduced to 5 feet when the storage room is protected by an automatic fire sprinkler system.
- All gas cylinders must be stored in approved storage racks or securely restrained.
 - Regulators, fittings or gauges on oxygen cylinders must never be lubricated with oil or any other flammable substance. Keep all oil, grease or other combustible materials away from oxygen storage equipment.

Transporting Cylinders

H-sized cylinders (250 cubic foot) shall be transported on a hand truck or cart designed for moving cylinders that is self-supporting and has a chain or stay to retain the cylinder. E-sized cylinders (25 cubic feet) are small and may be carried or transported on a cart, but they must always be stored in a rack or stand that provides physical support or restraint to prevent damage to the cylinder.

Relevant Documents

UC Davis EH&S [Safety Net #60, Compressed Gas Safety](#)

UCDMC [P&P 1635, Interim Life Safety Measure Program](#)

UCDMC [P&P 1685, Hazardous Gases/Handling and Storage of Compressed Gas Cylinders](#)