

5.1.3.3.1.5 Locations shall be chosen to permit access by delivery vehicles and management of cylinders (e.g., proximity to loading docks, access to elevators, passage of cylinders through public areas).

5.1.3.3.1.6 Indoor locations for oxygen, nitrous oxide, and mixtures of these gases shall not communicate with the following:

- (1) Areas involved in critical patient care
- (2) Anesthetizing locations
- (3) Locations storing flammables
- (4) Rooms containing open electrical contacts or transformers
- (5) Storage tanks for flammable or combustible liquids
- (6) Engines
- (7) Kitchens
- (8) Areas with open flames

5.1.3.3.1.7 Cylinders in use and in storage shall be prevented from reaching temperatures in excess of 54°C (130°F).

5.1.3.3.1.8 Central supply systems for nitrous oxide and carbon dioxide using cylinders or portable containers shall be prevented from reaching temperatures lower than the recommendations of the central supply system's manufacturer, but shall never be lower than -7°C (20°F) or greater than 54°C (130°F).

5.1.3.3.1.9 Central supply systems for oxygen with a total capacity connected and in storage of 566,335 L (20,000 ft³) or more at standard temperature and pressure (STP) shall comply with NFPA 50, *Standard for Bulk Oxygen Systems at Consumer Sites*.

5.1.3.3.1.10 Central supply systems for nitrous oxide with a total capacity connected and in storage of 1451 kg (3200 lb) or more shall comply with CGA G-8.1, *Standard for Nitrous Oxide Systems at Consumer Sites*.

5.1.3.3.1.11 Central supply systems for carbon dioxide using permanently installed containers with product capacities greater than 454 kg (1000 lb) shall comply with CGA G-6.1, *Standard for Insulated Carbon Dioxide Systems at Consumer Sites*.

5.1.3.3.1.12 Central supply systems for carbon dioxide using permanently installed containers with product capacities of 454 kg (1000 lb) or less shall comply with CGA G-6.5, *Standard for Small, Stationary, Insulated Carbon Dioxide Supply Systems*.

5.1.3.3.2* Design and Construction. Locations for central supply systems and the storage of positive pressure gases shall meet the following requirements:

- (1) Be constructed with access to move cylinders, equipment, and so forth, in and out of the location on hand trucks complying with 9.5.3.1.1
- (2) Be secured with lockable doors or gates or otherwise secured
- (3) If outdoors, be provided with an enclosure (wall or fencing) constructed of noncombustible materials
- (4) If indoors, be constructed and use interior finishes of noncombustible or limited-combustible materials such that all walls, floors, ceilings and doors are of a minimum 1-hour fire resistance rating
- (5) Be compliant with NFPA 70, *National Electrical Code*, for ordinary locations, with electrical devices located at or above 1520 mm (5 ft) above finished floor to avoid physical damage
- (6) Be heated by indirect means (e.g., steam, hot water), if heat is required
- (7) Be provided with racks, chains, or other fastenings to secure all cylinders, whether connected, unconnected, full, or empty, from falling

- (8) Be supplied with electrical power compliant with the requirements for essential electrical systems as described in Chapter 4 of this document
- (9) Have racks, shelves, and supports, where provided, constructed of noncombustible materials or limited-combustible materials

5.1.3.3.3 Ventilation.

5.1.3.3.3.1 Ventilation of Locations for Manifolds. Locations containing central supply systems or used for storing medical gas containers shall be ventilated to prevent the accumulation of medical gases from leaks and operation of cylinder or manifold overpressure safety devices in accordance with 5.1.3.3.3.1(A) through 5.1.3.3.3.1(G).

(A) Indoor supply systems shall have all relief valves vented per 5.1.3.4.6.1(4) through 5.1.3.4.6.1(9).

(B) Where the total volume of medical gases connected and in storage is greater than 84,950 L (3000 ft³) at STP, indoor supply locations shall be provided with dedicated mechanical ventilation systems that draw air from within 300 mm (1 ft) of the floor and operate continuously. A means of makeup air shall be provided.

(C) The power supply for mechanical ventilation fans shall conform to the requirements of an essential electrical system as described in Chapter 4 of this document.

(D) Where the total volume of medical gases connected and in storage is less than 84,950 L (3000 ft³) at STP or the only compressed gas in the room is medical air, natural ventilation shall be permitted to be employed.

(E) Where natural ventilation is permitted, it shall consist of two louvered openings, each having a minimum free area of 46,500 mm² (72 in.²), with one located within 300 mm (1 ft) of the floor and one located within 300 mm (1 ft) of the ceiling.

(F) Louvered natural ventilation openings shall not be located in an exit access corridor.

(G) Mechanical ventilation shall be provided if the requirements of 5.1.3.3.3.1(F) cannot be met.

5.1.3.3.3.2 Ventilation for Motor Driven Equipment. The following source locations shall be adequately ventilated to prevent accumulation of heat:

- (1) Medical air sources (*See 5.1.3.5.*)
- (2) Medical-surgical vacuum sources (*See 5.1.3.6.*)
- (3) Waste anesthetic gas disposal (WAGD) sources (*See 5.1.3.7.1.*)
- (4) Instrument air sources (*See 5.1.3.8.*)

5.1.3.3.3.3 Ventilation for Outdoor Locations. Outdoor locations surrounded by impermeable walls shall have protected ventilation openings located at the base of each wall to allow free circulation of air within the enclosure. Walls that are shared with other enclosures or with buildings shall be permitted to not have openings.

5.1.3.3.4 Storage.

5.1.3.3.4.1 Full or empty medical gas cylinders, when not connected, shall be stored in locations complying with 5.1.3.3.2 through 5.1.3.3.3 and shall be permitted to be in the same rooms or enclosures as their respective central supply systems.

5.1.3.3.4.2 Cylinders, whether full or empty, shall not be stored in enclosures containing medical air compressor