Alabama Department of Public Health, Technical Services Unit

Health Care Facility Oxygen Storage Requirements Revised 03/08/2013

These requirements are based on the following standards:

1. 1996 *NFPA 50, Bulk Oxygen Systems at Consumer Sites*
2. 1998 *NFPA 55, Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders* (used to clarify requirements of NFPA 99)
3. 1999 *NFPA 99, Health Care Facilities*, Chapters 4 and 8
4. Compressed Gas Association Document G-4, *Oxygen*, 1996 edition.
5. Compressed Gas Association Document P-2, *Characteristics and Safe Handling of Medical Gases*, 1996 edition.
6. CMS Memorandum S&C-07-10
7. A-cylinder = 2.5 cf; B-cylinder = 6 cf; E-cylinder = 24 cf; H-cylinder = 244 cf (all quantities are for oxygen)

A. OPERATIONAL SUPPLY, NOT CLASSIFIED AS STORED GAS:

1. Up to 300 cf of nonflammable medical gas (12 E cylinders or 1 H cylinder), per smoke compartment, may be located outside of an enclosure. This is in addition to individual cylinders in patient rooms, or otherwise arranged, for immediate use. (From later NFPA 99 edition, as approved by CMS letter, S&C-07-10.)
2. Containers must be secured to prevent them from tipping over or being damaged.

B. FOR ANY OXYGEN STORAGE AREA CONTAINING MORE THAN 300 CF OF GAS:

1. Cylinders shall be stored in a definitely <u>assigned location</u>. *CGA G-4, 4.1.1*
2. <u>Outdoors</u>: enclosed space that is secured against unauthorized entry. Enclosure and gate shall be constructed of noncombustible materials. *NFPA 99, 8-3.1.11.2(a)*; *NFPA 55, 2-1.2*
   A minimum of 25 percent of the perimeter shall be open to the atmosphere. *NFPA 55, 2-1.6.1*
3. <u>Indoors</u>: enclosed space with a door that is secured against unauthorized entry. One-hour rating is required where quantities of gas are 3,000 cubic feet or greater. (125 E-cylinders or 12 H-cylinders = 3,000 cf) *NFPA 99, 4-3.1.1.2(b)3 and 8-3.1.11.2(a); NFPA 55, 2-1.2*
4. No flammable gases or materials in the area. *NFPA 99, 4-3.1.1.2(a)2 and 8-3.1.11.2(b)*
5. Oxygen cylinders are permitted to be in a storage area containing combustibles or incompatible materials [*NFPA 99, 8-3.1.11.2(c), also 4-3.1.1.2(a)7*] only if the cylinders are:
   1. Minimum 20 feet from the combustibles, or
   2. Minimum 5 feet from the combustibles if *NFPA 13* sprinklered, or
   3. In a 30 minute fire-rated noncombustible cabinet, or in an approved flammable liquid storage cabinet.
6. Indoor storage areas which contain liquid oxygen, or more than 3000 cubic feet of stored oxygen, must have continuous natural <u>or</u> dedicated power ventilation to the outdoors, as described in the Code. *NFPA 99, 4-3.1.1.2(b).* Power ventilation must be connected to an emergency power source. *NFPA 55, 7-3*
7. Electrical devices are at least 5 feet above the floor. *NFPA 99, 4-3.1.1.2(a)4 and 8-3.1.11.2(f).*
8. Cylinder temperature shall not exceed 125 degrees F. *NFPA 55, 2-1.6.2 and 6-10, NFPA 99, 4-3.1.1.2(a)1 and 8-3.1.11.2(e)*
9. Sign posted on door or gate, reading, "CAUTION, OXIDIZING GASES STORED WITHIN. NO SMOKING". *NFPA 99, 4-3.1.1.2(a)11f and 8-3.1.11.3*

10. No sources of ignition in storage area, or within 20 feet of an outdoor area. *NFPA 99, 8-3.1.11.2(i)*
11. Cylinders are protected from falling or mechanical shock. *NFPA 99, 4-3.1.1.2(a)3 and 8-3.1.11.2(g), NFPA 55, 6-6*
12. Cylinder valve caps screwed on. *NFPA 99, 4-3.5.2.1(b)14 and 8-3.1.11.2(j*)
13. Outdoor storage that is adjacent to a building wall shall be at least 10 feet from any openings. *NFPA 99, 4-3.1.1.2(a)10b* Outdoor storage shall not obstruct the path of exit discharge from the building.
14. No air compressors or vacuum pumps in the space. *NFPA 99, 4-3.1.1.2(a)10d*

15. Prevent oil, grease, asphalt, or other readily combustible substances from contacting the cylinders, valves, regulators, gauges and fittings. *CGA P-2, 4.3.12 and CGA G-4, 4.3.3; NFPA 99, 4-3.5.2.1(b)1 and 8-2.1.1.3*
16. Full and empty cylinders in the same enclosure shall be segregated, with appropriate signage. *CGA G-4, 4.1.10; NFPA 99, 4-3.5.2.2(b)2*

C. FOR OXYGEN STORAGE AREAS WITH MORE THAN <u>20,000 CF</u> OF OXYGEN, per *NFPA 50,* (79 H cylinders, each "H" cylinder contains approx. 251 cf of gas, or three 70-gallon liquid oxygen containers, each equivalent to approximately 9000 cf of gas):

1. Must be in separate, **<u>outdoor</u>**, dedicated, above-ground, ventilated structure <u>or</u> in an open enclosure.
2. At least 50 feet from wood frame buildings, or 1 foot from buildings other than wood frame construction.
3. At least 10 feet from any public sidewalk or parked vehicles.
4. At least 10 feet from <u>any</u> opening in walls of adjacent structures.
5. The required clearances from adjacent buildings do not apply where a barrier of at least 2 hour fire resistance provides line-of-sight interruption between uninsulated portions of the bulk oxygen storage installation and the exposure. Oxygen piping and tanks must be at least 1 foot from the face of this barrier. See Section 2-2.1.14 of *NFPA 50* for complete requirements.

D. FOR ANY INDOOR <u>PIPED</u> OXYGEN STORAGE AREA:

1. One-hour fire rated space, dedicated to oxygen system and storage. *NFPA 99, 4-3.1.1.2(a)10c and 4-3.1.1.2(b)*3
2. Each system shall be inspected annually and maintained by a qualified equipment representative. *NFPA 50, 4-2.1*

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