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OSFM releases guidelines on Oxygen storage

A total of up to 300 ft.³ of oxygen may be stored per smoke compartment in any room or alcove without special requirements for that room
-Cylinders must be secured in racks or by chains

Quantities between 300 ft.³ and 3000 ft.³ of oxygen and nitrous oxide must be stored in special designated rooms that meet the following requirements:
Rooms must be of noncombustible 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 be placed within an enclosed cabinet having a fire rating of at least a half hour
- Cylinders must be secured in racks or by chains

Quantities of 3000 ft.³ or more of oxygen and nitrous oxide must be stored in special designated rooms that meet the following requirements:
- Have sufficient room to maneuver cylinders.
- Are able to be secured with lockable doors.
- Are constructed with noncombustible or limited-combustible construction, with a minimum fire rating of 1 hour (no allowances for fully sprinklered rooms).
- Are compliant with NFPA 70 National Electric Code, with electrical devices located at, or 5 ft. above, finished floor.
- Are heated by indirect means, if heat is required.
- Contain adequate racks constructed of noncombustible or limited-combustible materials and chains to secure all cylinders, full or empty.
- Contain a dedicated, continuously operating mechanical ventilation system that draws air from within 12 inches of the floor, with a means of make-up air provided.
- Include, where natural ventilation is permitted, a natural ventilation system consisting of two louvered openings, each having a minimum free area of 72 inches,² with one opening 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.

Definitions
- **One E**-size cylinder = 24.96 ft.³
- **Twelve E-**size cylinders = 299.52 ft.³
- Therefore, up to 12 E-size cylinders may be stored in any smoke compartment without special requirements for the room
- **One M-**size cylinders = 250 ft.³
- Therefore, **one M-size and two E-size** cylinders may be stored in any smoke compartment without special requirements for the room
- Cylinders on gurneys, crash carts, etc., are "in use" and not subject to the total count for 'in storage"- Cylinders in a rack are "in storage"
- Empty cylinders are not considered part of "in Use" or "in storage"

1 Cubic ft. equals 28.31 liters
Cylinder capacities by type are:
D 13 cu ft

E 22 cu ft
M 107 cu ft
G 187 cu ft
H or K 244 cu ft

C. Patient care areas are limited to storing up to 12 total oxygen "E" cylinders (including both full and "empty" cylinders). Empty and full cylinders must be stored separately and kept secured in either a rack or mobile carrier. Storage areas must be appropriately labeled, for empty and/or full cylinders.

High Pressure Returnable Cylinders (K, H, B, C, ER, DR, AL, BL, CL, ZDL)

Cylinder Size	K	H	B	C	ER	DR	AL	BL
Volume - internal (liters)	49.6	43.8	17.2	8.13	4.73	2.89	29.5	15.7
Pressure (psig)	2400	2000	2000	2000	2000	2000	2000	2000
Dimensions (w" x h")	9.2 x 60	9 x 55	8.5 x 30	6 x 23	4 x 30	4 x 21	8 x 52	7 x 37
Weight (Tare) lbs.	142	110	58	26	14	11	49	14
Typical Full Gas Content								
Liters	8000	6000	1800	943	620	370	4000	2150
Cubic Feet	286	212	83.3	39.3	22.9	14	143	76
Material of Construction	Steel	Steel	Steel	Steel	Steel	Steel	Aluminum	Aluminu

- Room has a 1-hour rated enclosure with 3/4-hour rated door that can be secured against unauthorized entry.
- Room has continuous natural or dedicated mechanical ventilation to the outdoors. Natural ventilation requires equal to or greater than 72 square inch openings.
- Electrical devices must be at least 5 feet above the floor of the storage area.
- No-smoking signs must be posted in the storage area.
- There may be no sources of ignition inside the storage area.
- The oxygen must be stored in separate, outdoor, dedicated, above-ground, ventilated structures or in an open enclosure.
- The structures must be at least 50 feet from wood frame buildings, or one foot from buildings of other than wood frame construction.
- The structures must be at least 10 feet from any public sidewalk or parked vehicles.
- The structures must be located more than 25 feet from any building window and at least 10 feet from any other opening in walls of adjacent structures.
- Clearances 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 kept at least one foot from the face of this barrier.

Unit Conversion Data for Oxygen

	Weight		Gas		Liquid	
	pounds (lb)	kilograms (kg)	cubic feet (scf)	cu meters (Nm^3)	gallons (gal)	liters (l)
1 pound	1.0	0.4536	12.076	0.3174	0.105	0.3977
1 kilogram	2.205	1.0	26.62	0.6998	0.2316	0.8767
1 scf gas	0.08281	0.03756	1.0	0.02628	0.008691	0.0329
1 Nm^3 gas	3.151	1.4291	38.04	1.0	0.3310	1.2528
1 gallon liquid	9.527	4.322	115.1	3.025	1.0	3.785
1 liter liquid	2.517	1.1417	30.38	0.7983	0.2642	1.0
1 short ton	2000	907.2	24160	635	209.9	794.5

Scf (standard cubic foot) gas measured at 1 atmosphere and 70℉.
Nm3 (normal cubic meter) gas measured at 1 atmosphere and 0℃.
Liquid measured at 1 atmosphere and boiling temperature.