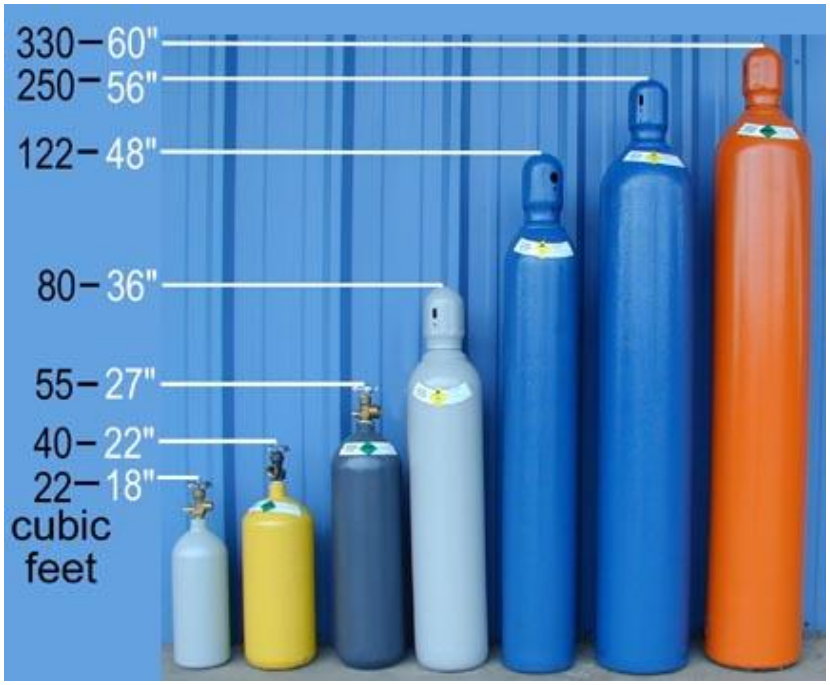
Compressed Gas Cylinders



General Characteristic

Cylinders of compressed gases can pose a chemical as well as a physical hazard. If the valve were to break off a cylinder, the amount of force present could propel the cylinder through a brick wall. For example, a cylinder of compressed breathing air used by SCUBA divers has the explosive force of 1 ½ pounds of TNT.

Use and Storage of Compressed Gases

- Whenever possible, use flammable and reactive gases in a fume hood or other ventilated enclosure. As noted previously, certain categories of toxic gases must always be stored and used in ventilated enclosures. Note any specific gases that require ventilated storage. Maximum allowable storage limits are given in Table 1.
- Storage areas must be located away from sources of ignition or excess heat.
- Cylinder temperature must never exceed 51 degrees C (124˚F).
- Cylinders must always be stored in an upright position.
- Cylinders will be chained or strapped in place to prevent falling, even if they are assumed empty.
- Close the main cylinder valve whenever the cylinder is not in use.
- Cylinder caps will be in place at all times when not in use.
- Oxygen should be stored in an area that is at least 20 feet away from any flammable or combustible materials (including gasses) or separated from combustibles by a non-combustible barrier at least 5 feet high and having a fire-resistance rating of at least 1½ hours.
- Always use the appropriate regulator on a cylinder. Do not attempt to adapt or

modify a regulator to fit a cylinder for which it was not designed. Regulators are designed to fit only specific cylinder valves to avoid improper use.

- Inspect regulators, pressure relief devices, valves, cylinder connections, and hose lines frequently for damage.
- Do not use a cylinder that cannot be positively identified. Color-coding is not a reliable way of identifying a cylinder because the colors can vary from supplier to supplier.
- Do not use oil or grease on any cylinder component, because a fire or explosion can result.
- Do not transfer gases from one cylinder to another. The gas may be incompatible with the residual gas remaining in the cylinder or may be incompatible with the cylinder material.
- Never completely empty cylinders during lab operations.
- When opening the cylinder valve, crack the valve first to ensure the regulator and plumbing can handle pressure, and then slowly open the valve.
- Leave approximately 25 PSI of pressure. This will prevent any residual gas in the cylinder from becoming contaminated. If the cylinder is non- returnable, call EHS. If inert gas, vent the remainder of the gas. If not inert gas, react off the remainder of gas. In either case, EHS will be able to discard the cylinder after valve removal. If venting or reacting is unsafe, EHS can still dispose of most cylinders.
- Orient cylinders so that the main valve is always accessible and the name of the gas is visible.
- Always secure cylinders (empty or full) to prevent them from falling over and damaging the valve (or falling on your foot). Secure cylinders by firmly chaining or strapping them to a wall, lab bench, or other fixed support.
- Old, empty, or unusable cylinders will be returned to the supplier or disposed of in a manner in accordance with all federal, state, local and incorporated guidelines. An existing agreement should to be in place for the supplier to accept containers once they are no longer needed before receiving them.
- To transport a cylinder, put on the safety cap and strap the cylinder to a hand truck in an upright position.
- Always clearly mark empty cylinders and store them separately.
- Be careful while handling compressed gas cylinders and never drop or strike a cylinder against anything.
- Only compatible gases should be stored together in a gas cylinder cabinet.

First aid

The health effects of compressed gasses vary depending on the composition of the gas. First aid procedures outlined in the SDS should be followed in the event of exposure.

Table 1. Allowable Quantity of Gases per Laboratory

	Unsprinklered Areas		Sprinklered Areas	
Materials	**No gas cabinet, gas room, or exhausted enclosure**	**Gas cabinet, gas room, or exhausted enclosure**	**No gas cabinet, gas room, or exhausted enclosure**	**Gas cabinet, gas room, or exhausted enclosure**
Corrosive Gas				
Liquefied	68 kg (150 lb)	136 kg (300 lb)	136 kg (300 lb)	272 kg (600 lb)
Nonliquefied	23 m^3 (810	46 m^3 (1620 ft^3)	46 m^3 (1620	92 m^3 (3240
Cryogenic Fluid				
Liquefied	0 L (0 gal)	170 L (45 gal)	170 L (45 gal)	170 L (45 gal)***
Nonliquefied	170 L (45 gal)	340 L (90 gal)	340 L (90 gal)	681 L (180 gal)
Flammable Gas				
Liquefied	114 L (30 gal)	227 L (150 gal)	227 L (60 gal)	454 L (120 gal)
Nonliquefied	28 m^3 (1000	28 m^3 (2000 ft^3)	28 m^3 (2000	56 m^3 (4000
Highly Toxic Gas				
Liquefied	0 kg (0 lb)	2.3 kg (5 lb)	0 kg (0 lb)	4.5 kg (10
Nonliquefied	0 m^3 (0 ft^3)	0.6 m^3 (20	0 m^3 (0 ft^3)	lb) 1.1 m^3
Nonflammable Gas Liquefied	No	No Limit	No	No
Nonliquefied	Limit	No Limit	Limit	Limit
Oxidizing Gas				
Liquefied	57 kg (15 gal)	114 kg (30 gal)	114 kg (30 gal)	227 L (60 gal)
Nonliquefied	43 m^3 (1500	85 m^3 (3000 ft^3)	85 m^3 (3000	170 m^3 (6000
Pyrophoric Gas				
Liquefied	0 kg (0 lb)	0 kg (0 lb)	1.8 kg (4 lb)	3.6 kg (8 lb)
Nonliquefied	0 m^3 (0 ft^3)	0 m^3 (0 ft^3)	1.4 m^3 (50	2.8 m^3 (100
Toxic Gas				
Liquefied	68 kg (150 lb)	136 kg (300 lb)	136 kg (300 lb)	272 kg (600 lb)
Nonliquefied	23 m^3 (810 ft^3)	46 m^3 (1620 ft^3)	46 m^3 (1620 ft^3)	92 m^3 (3240 ft^3)

NOTE: Amounts above are subject to change depending on laboratory construction and location. For additional information, call EHS.