

	Standard Operating Procedure		
	<b>COMPRESSED GAS CYLINDERS</b>		Page 1 of 4
	Investigator: General Safety	Location: EHS	Revision: 00

**1.0 PURPOSE:**

Compressed and liquefied gases are routinely used in laboratory and various other operations at Louisiana State University. Improper handling of compressed gas cylinders can result in adverse physical (i.e., explosions, fires, etc.) or health (e.g., chemical exposures) effects. This SOP provides general safety procedures for handling, storing, and using compressed gas cylinders.

**2.0 SCOPE:**

This procedure applies to all Louisiana State University Personnel that use and handle compressed gas cylinders. It is the intent of this guideline to provide information on the safe usage of compressed and liquefied gases at LSU and afford employee protection from potential health and physical hazards associated with gas and cylinder usage.

**3.0 RESPONSIBILITIES:**

Only trained and qualified personnel shall be allowed to use compressed and liquefied gases. Supervisors are responsible for ensuring that personnel are trained to handle compressed gas cylinders. All personnel that use and handle compressed gas cylinders are responsible for reading and understanding this procedure.

**4.0 DEFINITIONS:**

- 4.1 Compressed gas cylinder – A metal pressure vessel that contains gaseous material stored under high pressure.
- 4.2 Liquefied gases – A material that exists as a liquid under high pressure that vaporizes to a gas upon release to a lower pressure.

**5.0 REFERENCES:**

Monographs published by the Compressed Gas Association provide detailed information relative to specific gases. Link:

<http://www.cganet.com/publication.asp>

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**6.0 MATERIALS and/or EQUIPMENT:**

Appropriate fittings, valves, regulators, and other ancillary equipment.

Appropriate transport means.

**7.0 PROCEDURES:**

- 7.1 Inspect all cylinders upon delivery for valve protection and hydrostatic test date. Cylinders should be stamped to indicate testing within the past 5 years. The hydrostatic test date will be stamped into the cylinder. A stamp of “2MM84+” indicates that the cylinder was tested in February of 1984; “MM” are the initials of the inspector; and “+” indicates that the cylinder is authorized for charging up to 10% in excess of the marked service pressure. Other stampings will appear on the opposite side of the collar of the cylinder, an example of which is provided below. In this example, “DOT 3AA2265” indicates that the cylinder meets the United States Department of Transportation Specification 3AA and that it has a service pressure of 2265 psig at 70° F. The “K161110” is the manufacturer’s assigned serial number for the cylinder. The “BTWECO” is the manufacturer’s unique symbol.
- 7.2 Provide training to users on the installation and use of fittings, valves, regulators, and other ancillary equipment.
- 7.3 Use an appropriate hand-truck to move cylinders. Strap the cylinder onto the hand truck before moving, and ensure that the cylinder valve cap is securely in place. Do not roll cylinders or permit them to drop. Strap all cylinders, full or empty, securely in an upright position during use and storage.
- 7.4 Use a cylinder cap hook to loosen tight cylinder caps. Never apply excessive force or pry off caps. Return to supplier to remove “stuck” caps. Do not remove the cylinder valve cap until the cylinder has been secured at the point of use.

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- 7.5 Inspect the valve assembly for damage. Return the cylinder to the manufacturer if damage is noted. Do not use the cylinder.
- 7.6 Inspect ancillary connections, valves, regulators, tubing, and other devices used with compressed gases regularly. Replace when signs of damage or deterioration are noted.
- 7.7 Use an appropriate regulator for the gas and pressures involved. Regulators are not all created equal. Keep piping, regulators and other apparatus gas tight to prevent gas leakage and confirm gas tightness by using compatible leak test solutions (e.g., soap and water) or leak test instruments. Do not use Teflon tape on CGA fittings (straight thread) where the seal is made by metal-to-metal contact. Use of Teflon tape causes the threads to spread and weaken, increasing the likelihood of leaks.
- 7.8 Use fittings and tubing that are compatible with the contents of the container. For example, copper fittings are incompatible with acetylene and can form explosive deposits. Oxidizing gases are particularly hazardous when in contact with oil, grease, or other organic substances. Never use adapters or exchange fittings between tanks and regulators.
- 7.9 Open cylinder valves slowly and while pointed away from the operator. Ensure that pressure reducing regulators are installed prior to opening a high pressure cylinder valve. Close valves on gas cylinders when a system is not in use.
- 7.10 Always close the cylinder valve of an apparently empty cylinder before disconnecting the regulator. Mark all empty cylinders as "empty" or "MT."
- 7.11 Do not store cylinders in hallways or other egress areas.
- 7.12 Storage areas for full cylinders should be well ventilated, where the ambient temperature will not exceed 125° F. Segregate cylinders of incompatible gases.
- 7.13 Be especially careful with cylinders of corrosive materials (i.e., hydrogen chloride, hydrogen fluoride), flammable gases (acetylene, hydrogen,

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methane), oxidizing gases (oxygen, chlorine, fluorine and nitrous oxide). Improper maintenance or damage can cause the entire valve to come off and release the contents of the cylinder. This results in a secondary hazard.

**8.0 CONTINGENCIES:**

Should there be a suspected leak, close all regulator valves and tighten the packing nut. If the leak continues, initiate the following procedures:

- 8.1 If the leak is minor, secure the cylinder next to a fume hood
- 8.2 If the leak is major, evacuate individuals from the area and call the emergency response (911). Observe appropriate procedures for personal injury or fire as provided on OES Web site.

**9.0 REVIEWS AND REVISIONS:**

This procedure shall be reviewed for compliance and effectiveness and revised as necessary on an annual basis.

**10.0 ATTACHMENTS and REFERENCE FORMS:**

See attached

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**SPECIALTY GAS CYLINDER INFORMATION**

Cylinder Size	Nominal Dimensions Dia. x Lgth. (in.) (Cap Included)	Average Tare Weight (lbs) (Valve Included)	Internal Water Volume @70°F, 1 Atm		Service Pressure (psig)
			Its.	cu.in.	
<b>STEEL CYLINDERS</b>					
500	10 x 56	303	43.5	2640	6000
T	10 x 61	143	49	2980	2400
K	9 x 56	133	43.5	2640	2265
K	9 x 56	112	43.5	2640	2015
Q	7 x 32	63	16	960	2015
G	6 x 24	28	8	490	2015
R	5.25 x 19	12	3.5	212	2015
6	4 x 15	7	2.3	138	2015
2 or L.B.	2 x 13	3.5	0.44	27	1800
<b>ALUMINUM CYLINDERS</b>					
K(AL)	8 x 53	49	29.5	1800	2015
Q(AL)	7 x 33	32	16	960	2015
G(AL)	7 x 21	15	5.9	360	2015
<b>ACETYLENE CYLINDERS</b>					
WKN	12 X 49	175	71.75	4375	250
WSN	8 X 41	70	24.9	1516	250
<b>LOW PRESSURE CYLINDERS</b>					
IF	15 X 43	72	109.6	6687	
150	12 X 45	48	85	5150	480

