Gas Cylinders

Audience  All personnel in the Pulmonary Laboratories: Pulmonary Function Clinic, Bronchoscopy Service and Center for Pulmonary Rehabilitation.

Purpose  To provide safety guidelines for the use of compressed gas cylinders.

Definition  A compressed gas is any material in a container exhibiting as absolute pressure of 40 psi at 20°C or in excess of 104 psi at 54.5°C. They must be stored in heavy-walled metal cylinders, specially constructed and tested for such uses. The cylinders shall always be secured during transport and storage.

Receiving  Inspect the cylinder(s) for damage upon receipt.
• Return to vendor if severe corrosion is observed.
• The cylinder must be properly labeled as to contents, last date of hydrostatic testing, and have a DOT-Department of Transportation label.
• A cylinder must have a protective, screw-on cap over the valve. If any of the above points are deficient, return the cylinder to the vendor and notify Health and Safety Services at Ext. 24190.

Rules  Rules for handling compressed gas:
• Always use a hand truck transport. Chain cylinder to hand truck.
• DO NOT transport in closed vehicles.
• Cylinders must be chained in place or otherwise secured at all times.
• DO NOT DROP cylinders, or otherwise permit them to strike each other.
• Leave valve cap on cylinder until secured and ready for use.
• Ground all cylinders containing flammable gases.
• Use only in upright position.
• Empty cylinders must have safety caps securely over valve.
• Poisonous gases should be used in a fume hood or in a properly ventilated area and with proper respiratory protection available.

Rules for Storage  Rules for storage include the following:
• Cylinders in storage must be grouped by type of gas.
• Empty cylinders must be properly marked “EMPTY” and separated from full cylinders. Remove empty cylinders from laboratory and return to supplier as soon as possible.
• Flammable gases (Hydrogen, Acetylene, etc.) must be separated from oxidizing gases by a distance of 20 feet or more, or by a two-hour fire wall (constructed of material proven to retard fire by at least two hours), five feet high. The storage area must not contain other highly flammable materials (oil, gasoline, etc.).
• Cylinders must not be subjected to temperatures above 125°F.
- Store in a fire proof, dry, well, ventilated area.
- The storage area must not contain any source of ignition.
- Floor should be level and cylinders should be protected from dampness.
- Cylinders must be stored in an upright position, chained to a wall to prevent falling.
- Do not store in heavy traffic areas.
- If more than one cylinder of highly flammable gas is to be placed in a laboratory room, written permission must be obtained from HSS.
- Cylinder size will be limited to 200 cubic feet.
- When practical, valves on flammable gas cylinders should be closed, before all employees leave the laboratory at night.
- Piping must be compatible with the gas, e.g., no copper for acetylene, no plastic in any high-pressure portion of a system.
- A small amount of gas must be left in the cylinder and the valves must be closed to prevent contamination of the inside of the cylinder.
- Store well away from open flames or other heat sources.
- Do not store in hallways or corridors.
- Do not store within exhaust canopies.

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**Leak Detection**

Leak testing using a soap solution should be done twice. The first test should be made before the regulator or needle valve is attached, to determine if there are leaks at the union of the cylinder and cylinder valve, and to determine if the valve is leaking. The second test should be made after the regulator is attached and they cylinder valve is opened so as to detect leaks around the valve stem packing, the connecting fittings, the regulator or needle valve, and the transfer lines to the instrument.

Personnel should not attempt to repair cylinder leaks or leaks caused by loose valve stem packings. Leaking cylinders of nontoxic, nonflammable gases may be taken to a loading dock or other place having suitable airflow, for the vendors to pickup. Leaks from cylinders of toxic or flammable gases require immediate attention. The kind of gas, the size of the leak, the location of the cylinder, etc., determines how this problem will be handled. Personnel must wear gas masks and appropriated protective clothing when attempting to move leaking cylinders of toxic gases. Contact HSS, Ext. 24190 for assistance.

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**Restricted Product**

Highly toxic gases may be purchased and used only upon written permission of the director of HSS. The director must be notified of the intent to work with highly toxic gases prior to their proposed purchase.

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**References**

UTMB Safety Manual, Chapter 7, Section 7.0 Gas Cylinders, Materials Management Delivery Guide
This form documents the approval and history of the policies and procedures for the Pulmonary Function Laboratory. The Medical Director signs all policies verifying initial approval. Annually thereafter, the Director and/or designee may approve reviews and revisions.

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