COMPRESSED GAS CYLINDER SAFETY

A. Introduction:

1. The use of compressed gas cylinders is a frequent adjunct to Laboratory and Facilities Management daily operation. These cylinders can contain gases that vary in chemical properties from inert and harmless to toxic and explosive. In addition, the high pressures of these gases constitute a serious hazard in the event that the cylinders are exposed to physical damage and/or high temperatures.

B. Responsibilities:

1. Environmental, Health, and Safety Department:
   a. Be aware of what types of gases are being stored in compressed cylinders and where.

   b. Ensure all parties handling compressed gas cylinders have been properly trained in their dangers and handling practices.

2. Employees/Lab Workers/Researchers
   a. Attend any required training on compressed gas cylinder safety

   b. Store and handle compressed gas cylinders properly according to the UNE rules/regulations.

   c. Report any problems/concerns regarding gas cylinder safety to EHS.

C. Policies, Practices, and Procedures:

1. Identification: Compressed gas cylinders will be legibly marked, with either the chemical or trade name of the gas, for the purpose of identifying gas content. Cylinders will be marked by the distributor with stencil, stamp, or securely attached label. Whenever practical, the marking will be on the shoulder of the cylinder. Markings, labels, decals, tags, or stencil marks used for the identification of contents will not be defaced. No marks or numbers stamped into a cylinder will be changed or obliterated. Painting of cylinders is prohibited as most are color coded for the type of gas that is inside the cylinder.

2. Repairs and Alterations: Cylinders, valves, or safety-relief devices will not be repaired or altered except by the vendor.

3. Inspections: Compressed gas cylinders will be inspected by the user prior to and during use to determine that cylinders are in safe condition for use. Inspect for corrosion, valve damage or leaks, evidence of tampering, etc. Never use a flame to detect flammable gas leaks.

4. Moving and Handling:

   a. Caps will be kept on at all times except when cylinders are physically connected to a regulator, manifold, or distribution apparatus.

   b. Cylinders will not be lifted by the cap.

c. Cylinders will not be dropped or permitted to strike against each other or other surfaces violently.

d. Cylinders will be transported by suitable hand trucks, or rolled on the bottom edge.

e. Before returning cylinders to the supplier, the valve will be closed and the protective cap reattached.

5. Storing Cylinders:

a. Compressed and liquefied gases in portable cylinders will be stored in accordance with National Fire Protection Association (NFPA) standard number 55 and will be chained to a stand or the wall at all times when not in use to prevent them from being knocked over. Cylinders should be chained/strapped individually and nesting of cylinders should be avoided. If it is unavoidable due to spatial constraints to chain the cylinder individually, please contact EHS to evaluate the individual situation and make a recommendation.

b. Cylinder storage areas will be posted prominently with the types of gases to be stored.

c. Where gases of different types are stored at the same location, cylinders should be grouped by types of gas, and the groups arranged to take into account the types of gas contained, e. g., flammable gases will not be stored next to oxidizing gases.

d. When oxygen and a fuel gas such as acetylene are to be stored, they will be separated by a distance of twenty feet or by a non-combustible barrier at least five-feet high having a fire resistance rating of one-half hour. (The one exception is in the Facilities Mechanics Bay, Oxygen and Acetylene are always together on a cart and OSHA considers this “in use” or “ready to use” and has a letter of interpretation that allows for this as long as certain requirements are met.)

e. Cylinders will not be stored near highly flammable or combustible substances.

f. Charged and empty cylinders will be stored separately. Old stock should be stored in an accessible area so as to be removed first.

g. The gas cylinder storage area will be dry, cool, well ventilated, and fire resistant, where practical.

h. Heated storage areas will be arranged so that stored cylinders cannot be spot-heated or heated above 125 degrees F (51. 7C).

i. Cylinders should not be stored in the open; but in such cases where required, they will be protected against extremes of weather.

i. In summer certain gases when stored in the open should be protected from the continuous rays of the sun (refer to the supplier for specific recommendations).

ii. If ice or snow accumulates on a cylinder, it should be thawed at room temperature or with water at a temperature not exceeding 125 degrees F (51. 7C).

j. Cylinders will be protected from any object that will produce a cut or other abrasion in the surface of the metal. Do not store near the elevators or gangways, or in locations where heavy moving objects may strike or fall on them.

k. Cylinders will not be exposed to continuous dampness and will not be stored near salt or other corrosive chemicals or gases. Corrosion may damage the cylinders and may cause the valve-protective caps to stick. The bottoms of the cylinders should not be stored anywhere wet or damp that may cause rust.

6. Withdrawing Cylinder Content:

a. Cylinder valves should be opened slowly. Never direct high-pressure gas streams toward the body as embolisms can result from gas forced under the skin or entering a wounded area.

b. Only tools provided or approved by the gas manufacturer will be used to open cylinder valves. Never hammer the valve wheel in attempting to close the valve.

c. Do not attempt to open valves or caps that are hard to open or frozen because of corrosion. These cylinders must be returned to vendor.

d. Never use compressed gas, unless protected by suitable traps or check valves, where the cylinder or its contents is apt to be contaminated by the feedback of process material.

e. Before a cylinder is removed from service, determine that the cylinder valve is closed securely and all pressure is released from connected systems.

7. Securing Cylinders:

a. Cylinders will be secured to fixed structures or to movable carts in the case of gas, welding, or cutting apparatus. Cylinders should be chained/strapped individually and nesting of cylinders should be avoided. If it is unavoidable due to spatial constraints to chain the cylinder individually, please contact EHS to evaluate the individual situation and make a recommendation.

b. Cylinders will be secured by the body, at two-thirds the height of the cylinder, and not by the valve.

i. Cylinders will be secured by one of the following methods:

- Safety chain provided with a positive locking device such as a nylon strap with locking buckle or self-locking hook to prevent accidental release of cylinder.
- Nylon strap and buckle assembly with attachment fixture. This item is specially designed to restrain portable gas cylinders.

8. Tagging Procedure:

a. At the time of delivery a Standard Cylinder Status Tag will be placed on all cylinders by the purchasing department.

b. When the cylinder is placed in use, the bottom of the tag with the word "Full' will be removed.

c. When the cylinder is no longer required, the "In Use" section of the tag will be removed and the vendor will be called for pick-up. All cylinders will be treated as though residual gas remains.

9. Cylinder Defects and Disposal:

a. If a cylinder leak cannot be stopped by tightening a valve gland or packing nut, close the valve; and if possible, detach the cylinder from the installation. Contact the vendor for removal from the building.

b. When cylinders, valves, contents, etc., are in such a condition that the only safe or practical solution is disposal, request removal through the vendor.

c. If an unsafe condition exists, the pick-up request will be expedited by EHS.