[Minor revisions: December 2, 2014]

Angelo State University
Operating Policy and Procedure

OP 34.21: **Compressed Gas Handling, Storage, and Transportation**

DATE: December 2, 2014

PURPOSE: The purpose of this Operating Policy/Procedure (OP) is to ensure the safe handling, storage, and transportation of compressed gas cylinders.

REVIEW: This OP will be reviewed in October every three years, or as needed, by the director of risk and emergency management with recommended revisions forwarded through the vice president for finance and administration to the president by November 15 of the same year.

POLICY/PROCEDURE

1. Handling

Cylinders should always be moved with a hand truck, forklift, cylinder pallet system, or other means to keep cylinders from falling or striking each other or other objects. **Cylinders shall never be moved by rolling or dragging**. Never move cylinders using the valve or valve protection cap. Never use magnets as a lifting device. **Use a cylinder caddie/hand cart.**

a. Ropes, chains, or slings must never be used to lift or suspend cylinders unless, at the time of manufacturing, lugs were included to use as appropriate lifting devices. If these are not furnished, suitable cradles or platforms must be used for lifting.

b. Cylinders must not be dropped or slid in such a way as to damage the cylinder. Leaking, damaged, or defective cylinders should not be used without authorization from the gas supplier.

c. Cylinder maintenance, including painting, removal of product makings, modifications, alterations, blockage, or replacement of valves or pressure relief valves, must be performed only by a trained person under the direction and consent of the cylinder owner or an authorized representative.

d. Ensure cylinders are not damaged by electric current, and ensure that cylinders are not used as a grounding device or as part of the grounding circuit.

e. Do not expose gas cylinders to direct heat, flame, or extreme temperature. Temperatures above 125 degrees Fahrenheit may result in cylinders being damaged or affecting the integrity of the cylinder. If cylinders are exposed to fire or struck by a welding arc, notify the gas supplier before shipping these cylinders.

f. Cylinders exposed to low temperatures may undergo significant decreased impact resistance. Get approval from the supplier before subjecting cylinders to very low temperatures.

g. Cylinders designed for value cap protection shall have the cap secured in place until the cylinder is being used and the cylinder is secured to a solid object.

h. Where provided, valve outlet caps or plugs should be securely affixed to the valve outlet prior to transportation. These shall be used since they provide a secondary containment for the valve. These plugs shall be checked and tightened before returning the cylinder to the supplier.

2. Storage

Safe storage of compressed gas shall start with signs being posted identifying locations for gases and cryogenic liquids. Identification can be by name, hazard class, or both. Signs stating "No Smoking" shall be posted. Other storage considerations follow.

a. Storage areas shall be well drained, well ventilated, and built of fire resistant materials. Storage areas must not exceed 125 degrees Fahrenheit.

b. Adequate spacing shall be provided to allow cylinders to be grouped together by hazard class. Separate storage should be provided for full cylinders and empty cylinders.

c. Storage in basements shall be avoided. Cylinders shall be adequately separated from combustibles and not stored near flammables such as gasoline.

d. The minimum separation between liquefied petroleum gas containers and flammable liquid tank shall be 20 feet.

e. Do not expose cylinders to corrosives or chemical vapors.

f. Cylinders must be stored away from moving objects that could strike them. Cylinders must be secured at all times by a chain or similar restraint in such a manner that will prevent them from being accidentally tipped or knocked over.

g. Cylinders used in public areas must be protected against tampering by unauthorized personnel.

h. Cylinders may be stored outdoors; however, they shall not be exposed to damp areas for prolonged periods.

i. It is preferable to store cylinders on concrete.

j. Liquid oxygen should never be stored on asphalt or hydrocarbon-based paving materials that could cause a violent reaction if spilled.

k. Cylinders in service or in storage must be properly secured at all times to prevent falling.

3. Transportation

Compressed gases and cryogenic liquids are defined as hazardous materials by Department of Transportation (DOT) regulations. The preferred way to transport cylinders is to use a vehicle that is designed and equipped to do so.

These vehicles shall be ventilated and have adequate means to secure the cylinders. Persons transporting cylinders in a vehicle must:

a. Be knowledgeable of the hazards and precautions while transporting.

b. Check cylinders for leaks or physical damage prior to transport.

c. Ensure that cylinders are secure.

d. Ensure that protective caps and valve outlet caps are in place.

e. No smoking or open flames near cylinders.

f. Know what to do in case of leak, incident, or emergency.

g. Follow all traffic laws.

h. Know product regulations and supplier instructions.

The Department of Transportation regulates compressed gases by highway, rail, water, and air. These regulations are contained in Title 49 of the Code of Federal Regulations, parts 100-180.

4. Acetylene

a. Storage Procedures

Storage of acetylene shall comply with NFPA 51 [4]. Inside buildings, cylinders shall not be stored within 20 feet of oxygen.

(1) If the 20-foot separation is not possible, the acetylene and oxygen shall be separated by a noncombustible partition five feet high with a fire resistant rating of 30 minutes.

(2) Acetylene cylinders should not be stored in a horizontal position. This will cause loss of solvent that can cause lower flame quality and result in fuse plug failure.

(3) Acetylene cylinders must not be stored so that they could be struck or knocked over. The cylinders shall be secured while in storage or in use.

(4) Never attempt to store inject acetylene gas into any type of vessel, tank, or enclosure.

b. Handling Procedures

Always call acetylene by its proper name; never just label it as a gas. Proper handling includes, but is not limited to, the following:

(1) Never attempt to repair cylinders.

(2) If acetylene is leaking, move the cylinder outdoors and keep people away. Call the supplier to have cylinder removed.

(3) Keep sparks and flames away from acetylene.

(4) Never let flames come into contact with the fusible plug. They melt at 212 degrees Fahrenheit and can cause a sudden burst of flame up to 15 feet.

(5) Should the outlet valve clog from ice, thaw with warm water, not with hot water or flames.

(6) Cylinders must be protected against dropping while loading or unloading.

(7) When moving cylinders with a crane or hoist, use a cage or cradle to protect cylinders from damage.

(8) Use hand trucks to transport cylinders, and always secure cylinders to hand trucks. Never roll cylinders.

(9) Never drag cylinders from place to place.

(10) Always close cylinders before moving them, and ensure that the protective cap in place.

c. **Use**

Always use acetylene through a regulator attached to the cylinder outlet vale. Acetylene shall never be used at pressures exceeding 15 psi.

(1) Always open and close acetylene cylinder valves slowly to minimize pressure surges.

(2) Only use regulators designed for acetylene service.

(3) Flame arrestors and check valves should be installed at both torch base hose connections and at the regulator hose connections.

(4) Never use a hammer or mallet to open or close a valve.

(5) Never stand in front of a regulator and gauge faces while opening the cylinder valve.

(6) Always bleed pressure from the hoses and regulator before removing the gauge from the cylinder.

(7) Never apply a torch to the side of a cylinder to raise the pressure, serious injuries have occurred from this practice.