Handling and storage of portable LPG cylinders

By Lowell E. Snodgrass

Before you begin
Identify the liquefied petroleum gas (LPG) cylinders used in your workplace. These may be propane, acetylene, butane, or propane/butane mixture. Bring a cylinder of the most-used LPG to the discussion area. If cylinders are not available or difficult to bring, you can use photographs as visual aids. Identify and bring with you the material safety data sheets (MSDSs) for all LP gases used by the group. Check the areas where LPG cylinders are stored for your location, and note any problems in the storage area.

A variety of industries use LPG cylinders for many applications. Storage and handling of these cylinders depends upon the type, size and use. A few storage and handling requirements apply to all these cylinders. Of primary interest is the flammability of LPG at temperatures between 0 and 120 degrees F. This guide will discuss the storage and handling of portable cylinders smaller than 100-pound gross weight, but not the small butane single use canisters used in the food service industries.

Most liquefied petroleum gases used in industry are not classified as toxic. The greatest hazard in working with these cylinders is the risk of fire or explosion.

Common uses for LPG include:

- Acetylene for welding and cutting is dissolved in acetone to reduce the chances of auto-polymerization. This allows high-volume storage of acetylene at low pressures;
- Propane for lift truck motor fuel is normally mounted horizontally in a specially designed bracket. Specific training is required to avoid mis-mounting the cylinder;
- Propane used for other motor fuels may be attached for use of the liquid or the gas portion of the fuel. Cylinders designed for use of liquid fuel and those designed for using the fuel as a gas must be stored separately;
- Propane/butane mixtures for utility and construction site heaters are in 20-pound cylinders that commonly have no specific brackets. These must be secured in an upright position to avoid tipping over.

Review with the group the types of LPG cylinders used. Ask where the LPG cylinders are stored in your workplace, and add any storage areas not mentioned by the group.

Review the reasons the cylinders are stored in these areas. Go over the fire protection, security and inspection of the areas. NFPA recommends a fire extinguisher of 18 pounds of agent or more for cylinder storage areas. For security, always lock cages or storage rooms with controlled keys.

Ask the group where is it not safe to store LPG cylinders. Add that NFPA says they should not be stored on roofs, in ways of exit, under or on stairways, in areas of public access or near sources of ignition.

Ask the group how they get an LPG cylinder when they need one. Recognize the correct answers and review the procedures, including:

- Who has access;
- How to transport the cylinder to the point of use;
- Always check the cylinder for leaks (by odor), and have the safety pressure release valve at the vapor space of the cylinder (as marked on the cylinder). It must be secured against dropping or rolling, and must never be carried by holding onto the valve or connecting port.

Ask the group what you should check for when connecting a cylinder. Possible answers include:

- Oil, grease, dirt or corrosion on the connections;
- Damaged connections or connecting hoses;
- Damaged mounting brackets;
- An odor after the cylinder is attached. If the odor persists, the connection is leaking.

Ask the group what you should do if the connection is leaking when a fresh cylinder is being attached.

- For minor leaks, back off the connection and reseat the connectors;
- For a large leak, or if the second attempt fails, remove the cylinder, mark it as defective and try another;
- Observe caution to avoid freezing the skin from contact with the gas or liquid.

Go over the storage areas with the group. Note the reasons the storage areas are located as they are. Review the answers given in the discussion, and reinforce the most important points, such as: inspection of the cylinder before use, care in transporting the cylinder, testing for leaks when attaching a fresh cylinder, and avoiding sources of ignition in the storage area and when connecting a cylinder.

Address any concerns expressed by the group, and follow up the meeting with answers that are not immediately available.

Group actions

Ask the group to inspect the cylinders (or photographs) used as training aids, and take down any comments or questions they may have.

Have the group review any MSDSs you brought to the class.

Ask the group to look over the storage area when they are nearby, and think through the next time they might need to change a cylinder.

Have the members of the group who do not normally change cylinders observe others as they perform the task correctly.

Lowell E. (Rick) Snodgrass, a professional engineer, began his career in occupational safety, health and environmental control in 1971. He has managed these programs for Ferro Corp., Nestle' USA, Battelle Memorial Institute and KTH Parts Industries. Snodgrass is a past president of the Society of Ohio Safety Engineers and the Northern Ohio chapter of the American Industrial Hygiene Association. He has authored *Safety Leader's Discussion Guide* articles since 1982.

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References

Web sites

- National Propane Gas Association: www.npga.org
- Compressed Gas and Equipment (Occupational Safety and Health Administration): www.osha.gov/SLTC/compressedgasequipment/index.html
- UKLPG (United Kingdom): www.uklpg.org

Standard

- Liquefied Petroleum Gas Code, NFPA 58. National Fire Protection Association

Publication

- US EPA, 40 CFR Part 68, "Risk Management Program Guidance for Propane Users and Small Retailers," EPA 550-B-98-022

Videos

BWC's Division of Safety & Hygiene's video library has a number of videos on compressed gas cylinders. These are available for loan to Ohio employers. Order a catalog by calling **1-800-OHIOBWC** (ask for the video library), or visit our Web site, **ohiobwc.com**.