

Storage and Handling of Gases

10/02/06

In last month's *Safety Topic*, I talked about the hazard categories of gases and the fact that some gases have more than one hazard. Take for example chlorine. Its primary hazard category is a toxic/poison gas, but it's also an oxidizer and a corrosive gas. This is important information to know from both a handling and storage standpoint.

This month's topic is going to focus more on storage and handling. But, you may want to combine this with last month's topic to get a clearer and more complete overview of some of the storage and handling considerations you may need to think about based on the gases at your location. In fact, you may also want to combine this with the *Safety Topic* from March 2005 entitled *Cylinder Storage and Securement* to get yet a bigger picture of some of the requirements and best practices in the industry.

The following suggestions and recommendations do not include all the federal, state and local regulations and codes concerning the handling and storage of compressed gas cylinders.

Handling of Gas Cylinders

Most gas cylinders, full or empty, are big, heavy, awkward and hard to move. Personnel that are properly trained in the proper handling techniques should only handle cylinders. Full and complete compliance with the OSHA Hazard Communication Standard (HCS) is required. Improper handling can result in serious injuries such as strains, sprains and broken bones.

1. Cylinders should always be moved in hand trucks or carts specifically designed for moving cylinders.
2. Always use properly designed four-wheel hand trucks in good operating condition to move cryogenic liquefied gas containers.
3. Keep designated aisle ways free of obstructions so cylinders can be moved safely. Avoid congestion in cylinder movement areas.
4. Keep floors in good repair.
5. If cylinders must be moved or lifted from one level to another, use a lift specifically designed for cylinder movement or utilize a cylinder cage or cradle.
6. Always secure cylinders in storage, use or transit. Nesting of cylinders in storage is generally an approved method of cylinder securement for distributors.
7. Leave the valve protective cap or any valve seal protection in place until the cylinder is in place, secured and ready for use.
8. Wear safety shoes, leather gloves and safety glasses when handling cylinders. Other PPE requirements may be appropriate.
9. Employees must thoroughly understand the gas properties of the gases they are exposed to, the inherent physical and health hazards, necessary safety precautions and know how to respond to an emergency in case of a gas discharge or spill.

Storage of Gas Cylinders

Gases are classified and grouped into six main hazard categories as discussed in last month's *Safety Topic*. The categories are: toxic/poison, flammable, asphyxiant, oxidizer, corrosive, extreme cold and pyrophoric which is sub group flammable.

1. **Toxic/Poison** - These gases must be stored in accordance with local building and fire prevention codes. The total quantity of these gases on site should be kept to a minimum and you need to know in advance who will respond to an accidental toxic and/or corrosive gas release. Container storage areas must be prominently posted with the hazard class or the name of the gases stored. Storage area must be secured and locked. Separate storage for full and empty containers should be provided and posted and the storage should be arranged so that old stock is used first. The location of the storage area(s) is important in relation to occupied buildings and perimeter fence. Fixed-point detection systems with alarms are recommended, as are portable multi-gas monitors.
2. **Flammable** - These gases must be stored in well-ventilated areas away from oxidizers, open flames, sparks, and other sources of heat or ignition. No smoking signs must be posted around the storage area.
3. **Asphyxiant** - Inert asphyxiant gases may cause suffocation and should be stored in well-ventilated areas. These gases may be used to achieve required separation distances between other gases.
4. **Oxidizer** - Oxidizers must be stored separately from flammable gases or combustible materials and is extremely reactive with organic materials such as oil or grease. Other common oxidizing gases include chlorine, fluorine and nitrous oxide.
5. **Corrosive** - The same concerns, safe guards, considerations and recommendations listed under toxic/poison gases would apply to corrosive gas storage. Equip areas where exposure to corrosive gases exist with emergency showers and eye wash stations.
6. **Extreme Cold** - Store these products in well-ventilated areas to prevent hazardous concentrations of gases.