University of Illinois Materials Research Lab (MRL)

June 2019

Important Dates and Reminders

IMPORTANT DATES:

DAILY REMINDERS

- Use buddy system when working in labs
- Do not leave labs unlocked
- Be aware of your surroundings
- Remove lab PPE before leaving lab spaces. PPE is not allowed in public areas

Safety Newsletter

This month's topic is compressed gas cylinder safety.

Compressed gases expose users to both chemical and physical hazards. Gases contained within cylinders can be toxic, flammable, oxidizing, corrosive, inert, or a combination of these hazards. Because the pressurized chemical is released in gaseous form, a leak from the cylinder, regulator, or any part of the system used to deliver the gas can quickly contaminate a large area. Therefore, it is necessary to be familiar with the chemical hazards of the gas and possibility of asphyxiation.

In addition to the chemical hazards, there are hazards from the gas pressure and the physical weight of the cylinder. A gas cylinder falling over can break chemical containers and crush feet. The cylinder can itself become a dangerous propelled object if its valve is broken off. Appropriate care in the handling and storage of compressed gas cylinders is essential and information is provided below.

Airgas is currently the gas cylinder vendor on campus. If you have any questions or concerns regarding gas cylinders, please contact the Airgas University Specialist, Tyler McKenzie, at tyler.mckenzie@airgas.com or the Division of Research Safety.

Hazard Categories for Compressed Gases

Corrosive:

- Gases that corrode material or tissue with which they come in contact, or do so in the presence of water, are classified as corrosive.

Flammable:

- A gas at normal atmospheric temperature and pressure that can be ignited and burned when mixed with the proper proportions of air, oxygen, or other oxidizers is considered flammable.
- Changes in temperature, pressure, or oxidant concentration may cause the flammability range to vary considerably.

Inert:

- Gases that do not react with other materials at standard temperature and pressure are classified as inert. They are colorless, odorless, nonflammable, and nontoxic.
- The primary hazards of these gases are the high pressure and potential for asphyxiation. These gases are often stored at pressures exceeding 2,000 psi. They can displace the amount of oxygen necessary to support life when released in a confined place.
- Use of adequate ventilation and monitoring the oxygen content in confined places will minimize the danger of asphyxiation.

Oxidizer:

- Gases that do not burn but will support combustion are classified as oxidants.

Toxic:

- Gases that may produce lethal or other harmful effects on humans are classified as toxic. The degree of toxicity and the effects will vary depending on the gas. The Safety Data Sheet should be consulted to determine the toxicity.

Useful Contacts

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Storing Gas Cylinders

1. Always secure gas cylinders upright (with valve end up) to a wall, bench top, cylinder rack, or post unless the cylinder is specifically designed to be stored otherwise. Specially designed cylinder clamps can be purchased for securing a cylinder against a bench top. Gas cylinders must not be stored on gas carts. Do not strap cylinders to other cylinders.
2. Cylinders must be strapped or chained at, or slightly above, the midpoint. The strap must be tight around the cylinder to prevent it from tipping or moving.
3. Cylinders should be stored in a well-ventilated area away from sparks, flames, or any source of heat or ignition
4. Cylinders should not be exposed to conditions that may cause corrosion.
5. Never store gas cylinders in a location that could block exit routes.
6. Cylinders may be stored outside on a slab if they are protected from the direct rays of the sun. Do not expose cylinders to temperatures above 125 ºF.
7. Mark empty cylinders with an “empty” label.

Transporting Gas Cylinders

1. Always use a suitable cylinder cart for transporting cylinders, with the cylinder securely chained or strapped to the cart. Do not roll or drag a cylinder to move it or allow cylinders to strike each other or any other surface violently.
2. Protective valve caps must be secured when moving cylinders. Do not lift or move the cylinder by the cap.

General Use

1. The gas label provided by the vendor must be kept in its original condition.
2. Caps used for valve protection should be kept on the cylinder except when the cylinder is in use. A cylinder's cap should be screwed on tightly.
3. If a cylinder or valve is noticeably corroded, the gas vendor should be contacted for instructions. Any other damage that might impair the integrity of the cylinder should be called to the attention of the gas vendor before the cylinder is returned.
4. Transferring compressed gases from one commercial cylinder to another is not permitted.
5. Do not use compressed gas cylinders for any purpose other than for transporting and supplying gas.
6. Never tamper with, repair, or alter cylinders, regulators, or any pressure-relief devices. Return defective cylinders to the gas vendor immediately.
7. Do not attempt to remove a stuck cylinder cap by using a lever in the cap ports. The lever may accidentally open the valve when the cap turns.
8. Do not place cylinders where they might become part of an electric circuit or allow them to come into contact with an electrically energized system.
9. Use pressure regulators that are equipped with pressure relief devices.
10. Users must be properly trained in using gas cylinders by someone with experience.