Compressed Gas Safety

According to the OSHA Hazard Communication Standard **compressed gasses** are defined as:

1. A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 deg. F (21.1 deg. C); or
2. A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 deg. F (54.4 deg. C) regardless of the pressure at 70 deg. F (21.1 deg. C); or
3. A liquid having a vapor pressure exceeding 40 psi at 100 deg. F (37.8 deg. C) as determined by ASTM D-323-72.

Use, storage, and transport of compressed gasses are regulated and codified in OSHA Hazardous 29 CFR 1910.101 Compressed Gases (General Requirements). Compressed gases can be toxic, flammable, oxidizing, corrosive, or inert. In the event of a leak, inert gases can quickly displace air in a large area creating an oxygen-deficient atmosphere, toxic gases can create poison atmospheres, and flammable or reactive gases can result in fire and exploding cylinders. In addition, there are hazards from the pressure of the gas and the physical weight of the cylinder. A gas cylinder falling over can break containers and crush feet. The cylinder can itself become a missile if the cylinder valve is broken off.

Compressed gases can cause fires, explosions, oxygen deficient atmospheres, toxic gas exposures as well as the innate physical hazard associated with cylinders under high pressure. Special storage, use, handling and disposal procedures are necessary to ensure the safety of researchers using these chemicals and equipment.

Compressed gas cylinders can present a variety of hazards due to their pressure and /or contents. All compressed gases used at North Carolina Central University must be ordered through University Central stores.

Environmental Health and Safety Office should be contacted for assistance with these requirements and to provide assistance with the safe design of equipment used in connection with hazardous gases.

It is essential that employees handling compressed gases are adequately trained in the inherent hazards of the cylinders and their contents, as well as proper handling, storage, and use according to OSHA and NCCU requirements.
Work supervisors and lab Principal Investigators are responsible for assuring that the requirements of this section are followed by all persons under their supervision who use or handle compressed gas cylinders.

General cylinder safety

- Accept only properly identified cylinders and do not rely on color codes
- Wear safety equipment appropriate for the hazard potential of the gas before beginning work
- If a cylinder or valve is noticeably corroded, the vendor should be contacted for instructions
- A leaking cylinder should be removed and isolated in a well-ventilated safe area. If this occurs, immediately notify EHS or University Police after hours.
  - If the leak is at the junction of the cylinder valve and cylinder DO NOT try to repair! Instead, contact the supplier

Storage, Use and Handling

- Properly secure cylinders in a well ventilated and protected area away from heat, flames, and the sun.
- Segregate cylinders by hazard class while in storage.
- Discontinue use of the cylinder when it has at least 25 psi remaining; close valve to prevent air and moisture from entering. Return unused and empty cylinders to the vendor
- All empty cylinders must be marked “EMPTY”
- All compressed gas cylinders must bear labels that clearly identify the contents
- Compressed gas cylinders must be in an upright position and supported at all times, whether full or empty. Acceptable methods of support include:
  a. wall-mounted or bench-mounted gas cylinder brackets;
  b. chains or belts anchored to walls or benches; and,
  c. free-standing dollies or carts designed for gas cylinders and equipped with safety chains or belts.
- Gas cylinders must have the valve protection cap in place except when in use.
- Use appropriate dollies or hand trucks to move cylinders
- Pressure regulators and gauges must be compatible with the cylinder valves. You may not use “cheaters” (adapters) instead of the correct regulator and gauge.
- Prior to ordering cylinders of dangerous gases, such as ammonia, carbonyl sulfide, hydrogen cyanide, hydrogen sulfide, methylamine, and nitric oxide, you must have EHS approval and a Dangerous Gas Policy in place

Training

EHS has developed a compressed gas safety information training for compliance with OSHA Hazardous Materials standard (29 CFR Subpart H) which will be assigned to all personnel involved in the storage, use and transportation of compressed gas cylinders.

Please contact EHS at ehs@nccu.edu for additional guidance or information.