

Principal Investigator: _____

Date Approved: _____

Flammable Compressed Gases

Flammable compressed gases present serious fire and explosion hazards. Do not store near open flames or other sources of ignition. Flammable gases are easily ignited by heat, sparks, or flames, and may form explosive mixtures with air. Vapors from liquefied gas often are heavier than air, and may spread along ground and travel to a source of ignition and result in a flashback fire. Cylinders containing Acetylene should never be stored on their side.



Examples of flammable compressed gases include (but are not limited to) acetylene, hydrogen, and methane.

Personal Protective Equipment & Personnel Monitoring

Lab Coat	Gloves	Eye Protection
		
Traditional lab coat or flame-resistant lab coat when working with flammable materials.	For proper glove selection, review the chemical safety data sheet and consult glove manufacturer recommendations with your PI or supervisor.	ANSI Z87.1-compliant safety glasses or goggles.

Labeling & Storage

Flammable gases must be separated from oxygen and other oxidizing gases by a min. of 20 ft. Cylinders should be secured to a stable structure (ideally with double chains), such as a wall, with no more than three cylinders of equal size secured with a single set of chains. The first chain should be $\frac{1}{3}$ from the bottom of the cylinder and the second chain should be $\frac{1}{3}$ from the top of the cylinder. Alternatively, use a cylindrical casing to secure the cylinder to the floor next to your experimental setup. Refer to American Society of Mechanical Engineers code for Process Piping, ASME B31.3, to select compliant piping.

Ensure the cylinder is equipped with the correct regulator; if a regulator will not fit easily, don't force it- it may be the incorrect regulator for that cylinder. Flammable gas cylinder valves should not be opened more than $\frac{3}{4}$ turns of the spindle (preferably no more than $\frac{1}{2}$ of a turn); this reduces the risk of explosion and allows for the valve to be closed quickly,

cutting off the gas flow. Remove regulators from cylinders when not in use and replace the safety cap. If you ever suspect a gas cylinder is damaged, remove it from service and contact the Lab Services Supervisor and/or EH&S immediately.

When replacing a flammable gas cylinder, inform the Lab Services Supervisor and/or EH&S. The cylinder's connections need to be tested for leaks with an electronic leak detector.

EH&S staff check flammable gas cylinders monthly with the electronic leak detector. Contact EH&S if you have questions about the periodic testing process.

- **Acetylene:**
 - Do not use at operating pressures above 15 psig
 - Never use copper fittings or tubing on acetylene tanks - an explosion may result
 - Acetylene cylinders must never be stored on their side

WHAT NOT TO DO: Never store cylinders on transportation carts. Never use a cylinder without a regulator. Never permit the gas to enter the regulator suddenly. Never try to stop a leak between a cylinder and regulator by tightening the union nut unless the cylinder valve has been closed first. Never strike an electric arc on the cylinder. Do not move cylinders by hand long distances (more than several feet); always use a hand truck with the cylinder strapped. Never use flammable gas cylinders near fire or ignition sources.

Engineering Controls, Equipment, & Materials

- Non-sparking tools must be used on equipment that is attached to flammable gases
- For flammable gases, use a flashback arrestor between regulator and hose (prevents flame from entering cylinder)
- Consider a ventilated gas cabinet or chemical fume hood for flammable or irritating gases, depending on quantities used

First Aid & Emergencies

Inhalation

If you suspect that a person has lost consciousness due to oxygen deprivation, call 911 or TWU DPS (940-898-2911 in Denton; 214-689-6666 in Dallas; 832-870-6128 in Houston) and **do not** enter the room. Move affected individual(s) into fresh air only if safe to do so. If symptoms persist, seek medical attention.

Leaking

If you can safely stop the leak (such as a small leak), turn off the valve. Evacuate the room, turn off nearby ignition sources (if applicable) and inform DPS and EH&S and inform them of the leak and location.

If you cannot stop the leak, or if it is a large leak (hissing of the cylinder can be heard, gas gauge is quickly going down, etc.) evacuate the building immediately. On your way out, turn off nearby ignition sources *if you can do so quickly and safely*. Call DPS and inform them of the leak and location.

By signing and dating the log below, individuals are certifying that they have been informed and understand this Standard Operating Procedure and agree to abide by its contents.



Standard Operating Procedure Flammable Compressed Gases

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