

## Summary

**The use of any acetylene is subject to pre-approval by the Principal Investigator (PI) and/or the designated Laboratory Responsible Safety Person. Acetylene cylinders should be double chained to a stable structure such as a wall with no more than three cylinders of equal size secured with a single set of chains. Never use a cylinder without a regulator.**

This document covers basic chemical safety protocols (CSP) for acetylene and supplements the laboratory Chemical Hygiene Plan as appropriate. Additional lab-specific safety operating procedures for acetylene may also be required. The use of any acetylene is subject to pre-approval by the Principal Investigator (PI) and/or the designated Laboratory Responsible Safety Person. **DO NOT USE ACETYLENE UNTIL YOU HAVE OBTAINED THE NECESSARY PRE-APPROVAL AND TRAINING.**

## Acetylene

Acetylene is a flammable gas with the formula  $C_2H_2$ . Acetylene is unstable and can undergo explosive decomposition at high pressures. In order to prevent this, acetylene is typically sold as a dissolved gas. Modern cylinders are typically filled with a porous material and a solvent such as acetone, but older cylinders may be filled with carcinogenic *N,N*-dimethylformamide and/or asbestos.



## Personal Protective Equipment & Personnel Monitoring

**Lab Coat**

Flame-resistant lab coat.

**Gloves**

Consult with your PI or supervisor to determine the proper glove for your operation (e.g., welding vs chemical synthesis).

**Eye Protection**

ANSI Z87.1-compliant safety glasses or safety goggles.

## Labeling & Storage

Store acetylene away from combustible materials, oxidizing substances, and ignition sources. NFPA 55 requires that flammable cylinders in storage be separated from oxidizing gas cylinders by a minimum distance of 20 feet or by a noncombustible barrier at least five feet high and with a fire resistance rating of at least one-half hour. Section 2703.9.8 of the IFC requires the barrier to be not less than 18 inches above and to the sides of the stored material.

Acetylene cylinders should be double chained to a stable structure 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 1/3 from the bottom of the cylinder and the second chain should be 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.

**What not to do:** Do not use table/bench clamps for securing cylinders. Never store cylinders on transportation carts. Remove regulators from cylinders when not in use and replace with the safety cap.

Never use a cylinder without a regulator. 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.

### Cautions & Considerations

Acetylene may be stored as a dissolved gas at pressures up to 200 psi but should never be used or stored in its pure form at pressures above 15 psig.

Acetylene and oxygen cylinders may be used together on a cart for welding (i.e., an oxy-acetylene torch), but must be separated for prolonged storage.

### Engineering Controls, Equipment & Materials

#### Fume Hood

If your protocol does not permit the handling of these materials in a fume hood, contact the Department of Environmental Health, Safety and Sustainability (EHSS) to determine whether alternative engineering controls are warranted.

### First Aid & Emergencies

#### Releases

Immediately notify others in the area of the release and evacuate the location where the release occurred. Notify your PI/Responsible Safety Person and call Vanderbilt University Public Safety (VUPS) at 615-421-1911 (mobile) or use the VandySafe app on your smart phone. Report any exposure through Risk and Insurance Management's Origami portal and mark that it occurred in research when prompted. Both VUPS and the Origami system will notify EHSS of the incident. Remain on site at a safe distance to provide detailed information to first responders.

#### Skin or Eye Contact

Without putting yourself at risk, move person into fresh air. Remove contaminated clothing and accessories; flush affected area with water for at least 15 minutes. Get medical attention immediately.

#### Inhalation

Without putting yourself at risk, move person into fresh air. Get medical attention immediately.

### Waste Disposal

Refer to the laboratory *Chemical Hygiene Plan* (Section 6.7) for information on proper chemical waste disposal procedures.

Name	Signature	Date