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# Compressed Gas

## Standard Operating Procedure

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### Potential Safety Hazards

*Chemical Hazards* – Contents of a compressed gas cylinder may be flammable, corrosive, reactive, and/or toxic depending on the chemical involved. Be aware that the consequences of and unintended gas releases can be much more severe than liquid and solid releases.

*Catastrophic Pressure Release* – Many gas cylinders contain material under very high pressure. A catastrophic release of high pressure from a cylinder may have enough energy to propel a cylinder through a cinder block wall.

*Asphyxiation* – Pressurized gases released into a room or other confined area can displace oxygen resulting in suffocation. Even relatively non-hazardous gases such as nitrogen and carbon dioxide may displace oxygen.

### Safe Work Practices

#### *Lab Operations*

- Set up gas cylinder operations in well ventilated areas.
- Utilize the cylinder regulator valve to stop gas flow when it is not needed for a significant period of time. This will minimize the risk of a release downstream of the valve.

#### *Storage*

- Store gas cylinders upright in well ventilated areas.
- Secure gas cylinders with a chain or strap to a sturdy object such as a wall, heavy cabinet, or laboratory bench.
- Store gas cylinders with the valve protecting cap affixed when not in use (large cylinders).
- Utilize valve plugs during storage when available (some smaller cylinders).

#### *Transportation*

- Transport larger cylinders with a cart specifically designed to keep gas cylinders secure during transport. These carts typically have a chain/strap to prevent cylinder tip over.
- Transport smaller cylinders in a manner that prevents a cylinder from falling to the ground damaging the valve. Avoid flat carts without side walls as cylinders may roll off.
- Utilize valve caps and plugs during transport when possible.

### *Personal Protective Equipment (PPE)*

- Wear eye protection when setting up and testing pressurized systems that could fail in a manner that results in an object striking an eye.
- Wear additional PPE if required for the relevant hazardous gases.

## **Preparedness for Potential Compressed Gas Releases**

### *Release Awareness*

- Be aware of conditions that may indicate a potential compressed gas release.
  - unusual odors,
  - hissing sound, and/or
  - gauge reading showing an unexplained loss of pressure
- Recognize that there may be no obvious sign that a gas release has occurred.

### *Release Response*

- Be aware that compressed gas releases can vary from a minor inconvenience to an immediately dangerous to life and health situation.
- Understand the hazards of the relevant compressed gases. Reference the corresponding Safety Data Sheets (SDS) for details.
- Determine the existing response capabilities and limitations of persons in the work area. Utilize this information to plan for potential releases.
- Evacuate and call for outside assistance if needed.

## **Unneeded Material**

### *Waste Minimization*

- Acquire only the amount of compressed gas expected to be utilized in the near future.
- Utilize cylinders until empty to the extent possible.
- Provide partially used gas cylinders to co-workers using the same material.
- Contact the gas cylinder supplier to determine if they will take back unused product.

### *Disposal*

- Return empty gas cylinders to the supplier whenever possible.
- Dispose of gas cylinders that are no longer needed and that suppliers will not take back via the Environmental Health and Safety (EHS) Department (<https://www.isu.edu/ehs/>).

## **References**

29 CFR 1910.101 (OSHA Compress Gas Rules)

NFPA 55 (Compressed Gas Code)

Compressed Gas Association (cganet.com)