

Policy for safe Use, Storage & Transport of Compressed Gas Cylinders

Date: 20-November-2014

Revisions:

I PURPOSE

A number of standard practices have been devised for the use, handling, storage and transport of compressed gas cylinders on JNCASR campus. The principal aim of these guidelines is to reduce the risk to students, staff, faculty, and the general public, while handling the cylinders.

The following unsafe practices must be avoided:

1. Unsecured cylinders (cylinders not chained to stable structure)
2. Unprotected cylinders (cylinders stored without protective caps)
3. Non-compatible gases stored together (hydrogen and oxygen, flammable and oxidiser gases, respectively)
4. Cylinder valves are open when a cylinder is not in use (an attached regulator with a closed discharge valve is not sufficient)
5. The absence of appropriate personal protective equipment.

A General Use of Gas Cylinders

1. All the cylinders must bear an identification tag stating the name of the gas or the gas mixture. Do not rely on colour coding for identification of the gas.
2. Ensure that a comprehensive MSDS (material safety data sheet) is collected for every type of compressed gas cylinder.
3. Handle cylinders carefully and fasten them in a secure manner at all times in an upright position.
4. Using a soap solution, perform a leak test on all the connections leading to a cylinder .
Caution: Any gas, regardless of its health hazard, may cause asphyxiation by displacing oxygen.
5. Close the valves when the cylinder is not in use and then bleed the pressure from the regulator.
6. Close the valves on an empty cylinder and mark it as “empty.”
7. When classifying a gas mixture for use in the laboratory, classify the gas based on the most hazardous component in the mixture.
8. Do not bleed a cylinder completely. Leave a slight pressure to keep contaminants out.
9. When handling compressed gases, wear safety glasses and appropriate gloves all the time.
10. When using gases with cryogenic properties, allow adequate ventilation and wear personal protection equipment including heavy gloves and safety goggles. (Gloves must be loose fitting to facilitate rapid removal in case of a spill.)

11. Do not place cylinders in close proximity of an electric circuit.



Improper Storage of Gas Cylinder: Here the cylinders are stored near electrical cables. This should be avoided.

B Storage of Gas Cylinders

1. Store cylinders upright (vertically) in a ventilated area away from heat or a source of ignition (such as electrical outlets, ovens, etc).
2. Fasten cylinders securely at all times in an upright position. In case of the storage racks that hold two cylinders, each cylinder should be chained independently.



Storage racks for multiple cylinders that shows chaining of individual cylinders

3. Cylinders kept in a storage facility must be protected from weather extremes and direct sunlight. Protect the base of the cylinders from dampness (to avoid rusting).
4. Safety caps must be in place at all times when the cylinders are in the storage (not used or connected).

5. In the storage, empty cylinders must be always separated from full cylinders.
6. Cylinders should not be left unattended or stored in hallways, corridors, stairways, or other areas of access and/or egress. Even empty cylinders will have some pressure which can be dangerous if they fall.
7. Cylinders should not be stored at places, where they can obstruct and/or hamper emergency procedures such as near elevators, gangways, stairwells etc.

C Recommendations for the storage of Hydrogen cylinders outdoors

1. Do not install Hydrogen cylinders within 10 feet of windows, doors, or other building openings.
2. Keep the Hydrogen cylinders away from heat, sparks, or open flame. Use only spark-proof tools and explosion-proof equipment. See Section G for information on obtaining spark-proof tools.

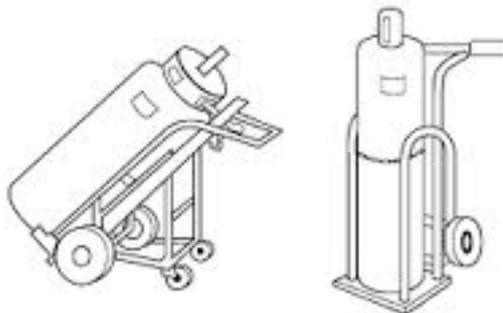


3. The storage area must have a minimum of 25% of the perimeter open to the atmosphere.
4. The storage area must be kept clear of dry vegetation and combustible materials and the open space must span at least 15 feet around the storage location.
5. Cylinders stored outside should not be placed on the ground or on surfaces where water can accumulate.
6. The roof/cover of the storage area must be of non-combustible construction material.
7. The electrical equipment located in the storage area must be non-sparking and explosion-proof.
8. Where Hydrogen is stored display notices prominently stating "NO SMOKING WITHIN 25 FEET"



D Transportation of cylinders

1. Gas cylinders can be transported only using a wheeled cart specifically designed for the cylinders. Remove regulators and attach safety caps before transporting the cylinders.
2. When transporting cylinders on an elevator, other passengers should not be permitted to use the elevator at the same time. Safety caps should be in place at all times during transport of cylinders.
3. Do not roll or lift a cylinder by holding the valve or valve cap while shifting.



Cylinder Trolleys

4. No more than one cylinder shall be handled at a time except on carts designed to transport multiple cylinders.
5. A 'Stairway' trolley must be used to transport cylinders on stairs.



E Special Precautions

Additional guidelines are provided here for cylinders containing oxygen, hydrogen, acetylene or liquefied fuel gas.

1. **Oxygen cylinders:** Oxygen cylinders should not be stored within 20 feet (6 meters) of highly combustible materials, oil, grease, wood shavings, or cylinders containing flammable gases. However, during experiments that require combined use of oxygen and acetylene the cylinders may be paired on a common transfer cart. . Do not oil or grease equipments that may come in contact with oxidizing gases. Keep greasy hands, rags and gloves away from any part of the cylinder and fittings.
2. **Hydrogen cylinders:** The storage location where Hydrogen cylinders are stored must contain notices permanently displaying the following information "HYDROGEN-FLAMMABLE GAS-NO SMOKING-NO OPEN FLAMES".

“HYDROGEN
FLAMMABLE GAS
NO SMOKING, NO OPEN FLAMES,”

F Guidelines for the Cylinder storage room:

- Storage rooms where cylinders containing flammable gases are stored must be well ventilated to prevent the accumulation of the gas
- No sources of ignition are permitted
- No Smoking signs should be prominently displayed
- Cylinders containing Acetylene or liquefied fuel gas should be stored with the valve end up. Acetylene storage areas must be well ventilated and open flames must be prohibited. Acetylene storage rooms should have no other compressed gases.
- Do not use copper fittings or tubing on acetylene cylinders.

G **Resources and contracts**

1. For Cylinder chaining contact Mr. Shyam Ph no: 9449155204.
2. For buying spark free tools contact
Azmeera & Sons
Mr. Moiz Ameer
16, S. P. Road,
Bangalore 560002
Phone: 08377805912