Compressed Gas Cylinders

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Authority: Chancellor

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Related Policies:

Additional Resources: OSHA 1910.101and Handbook of Compressed Gases

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1. Introduction

1.1. Purpose: The purpose of this regulation is to explicitly state the provisions of storage, use and handling of compressed gas cylinders in accordance with OSHA regulations. Compressed gases are classified based upon their chemical and physical hazards.

1.1.1 It is the goal of this regulation to ensure that users of compressed gases know the hazards associated with them as well as their proper operating, storage, and transporting procedures that are required by OSHA regulations.

1.1.2 This regulation applies to all who use compressed gas cylinders on East Carolina University campuses and satellite locations.

1.2. Cylinder Classifications:

1.2.1. Flammable Gas Cylinders:

1.2.1.1. These cylinders should never be used near open flames, heat sources, oxidizers, non-explosion proof electrical systems, or ungrounded electrical equipment.

1.2.1.2. Spark proof tools should always be available and in use when working with or on a flammable gas cylinder.

1.2.1.3. No smoking signs should be posted near the area along with a fire extinguisher.

1.2.1.3.1 Examples are: Acetylene, Butane, Natural Gas and Propane.

1.2.2. Asphyxiant Gases:

1.2.2.1. Inert asphyxiant gases may cause suffocation by reducing the oxygen levels to less than 19.5% in an immediate area.

1.2.2.2. Only specifically trained and qualified persons wearing a self-contained breathing apparatus should respond to an asphyxiant gas leak.

1.2.2.3. Examples are: Argon, Carbon Dioxide, Helium, Neon, Nitrogen and Xenon.

1.2.3. Oxidizing Gases:

1.2.3.1. These gases should be stored separate from flammable gas cylinders and combustible materials.

1.2.3.2. There should be a 20-foot separation or a five-foot tall barrier with a 30 minute fire rating separating the oxidizing cylinders.

1.2.3.3. All valves, piping, fittings and regulators shall be of a material and pressure rating compatible with Oxygen.

1.2.3.4. Examples are: Chlorine, Fluorine, and Nitrous Oxide.

1.2.4. Corrosive and Toxic Gases:

1.2.4.1. Exposure to these gases should be kept as low as possible, and within the exposure levels established by OSHA and ACGIH.

1.2.4.2. Corrosive and toxic gases should be stored in an adequately ventilated area, preferably in a separate room without any other occupancy.

1.2.4.3. Examples are: Carbon Monoxide, Hydrogen Cyanide, Hydrogen Sulfide, Phosgene, Hydrogen Chloride, Hydrogen Fluoride, and Sulfur Dioxide.

1.2.5. Cryogenic Gases:

1.2.5.1. To prevent thermal burns when working with cryogenic gases, appropriate (PPE) should be worn including eye protection devices (face shield and safety glasses or goggles), loose fitting insulated gloves, an apron and cuff- less pants.

1.2.5.2. These cylinders should be provided with a pressure relief valve.

1.2.5.3. Examples are: Liquid Helium, Liquid Oxygen, Liquid Hydrogen, and Liquid Neon.

2. Responsibilities:
2.1 Laboratory/Departmental Personnel:

2.1.1 Brody School of Medicine (BSOM) has cylinders delivered to storeroom located in the Brody School of Medicine; all other areas of East Campus and Health Sciences Campus have cylinders delivered directly to the laboratory/department.

2.1.2 Personnel in the departments or laboratories are responsible for the placement of cylinders in their areas; connection of piping, providing regulators and other apparatus, and ensuring that leak-testing of the system has been completed.

2.1.3 Laboratory personnel should be properly trained in accordance to applicable regulations and guidelines in regard to storage, use, and transport of cylinders.

2.2 Environmental Health and Safety (EH&S):

2.2.1 EH&S will provide basic Compressed Gas Cylinder Safety Training as a part of its Laboratory Safety Program.
2.2.1.1 This training is provided online and the roster will be used to identify laboratory users who are not trained.

2.2.2 Individual departments will be responsible for providing training specific to the gas and cylinder system in use in their area.

2.3 Medical Storeroom (Brody School of Medicine):

2.3.1 When the storeroom receives cylinders from the supplier, they are only responsible for delivery and removal of stored (not connected) cylinders from the BSOM clinics and laboratories.

2.3.2 BSOM storeroom personnel are not authorized to make connections or disconnections of piping, regulators or any other cylinder

apparatuses.

2.3.3 All other buildings and departments (East and Health Sciences campuses) are responsible for delivery, removal and correctly connecting the cylinders.

3. Procedures/Guidelines

3.1 General Requirements:

3.1.1 Cylinders must be secured in an upright position (preference is double chained-upper and lower) during use, transport, and storage.

3.1.1 Compressed gas cylinders shall be marked, labeled, stored, handled and used in accordance with applicable Federal, State, and local regulations.

3.1.2 The contents of a cylinder must be identified with a label that is visible at all times.

3.1.2.1Cylinder status (empty, full, in service/out of service) must also be identified.

3.1.3 Original labels from the manufacturer should never be removed or defaced.

3.1.3.1 If these labels become illegible, the cylinder should be re-labeled with the contents and status.

3.1.4 Cylinders should be visually inspected on a daily basis to ensure that there are no corrosions, leaks, and/or cracks around valves, piping, or regulators.

3.1.5.1 An emergency response plan for leaking cylinders (response determined by contents of the cylinder) must be developed.

3.1.5 A valve connection should never be forced; if the regulator has to be forced, then it is most likely to be the wrong regulator.

3.1.6.1 Before removing the regulator, ensure that the cylinder valve is closed and that the regulator has been relieved of gas pressure.

3.1.6 Except when the cylinder is in use, the cylinder valve shall be kept closed at all times (charged or empty).

3.1.7.1 Valve outlets should be pointed away from all personnel when the valve is being opened.

3.1.7 Only soapy water should be used to detect leaks; never use an

open flame.

3.1.8 Maintenance of cylinders and their valves should only be performed by trained personnel.

3.1.10 An emergency response plan should be developed and implemented whenever compressed gas cylinders and products are used, handled or stored.

3.2 Storage Guidelines:

3.2.1 All compressed gas cylinders should be secured to prevent them from falling, tipping, or rolling over.

3.2.1 Straps or chains connected to a wall bracket is acceptable as well as a cylinder stand as a means to immobilize the cylinders.

3.2.2 When not in use, all cylinders should be capped and all valves securely closed.

3.2.3 Cylinder storage areas should be clearly labeled with the names of the gases stored in that location.

3.2.4 Storage areas should be dry, cool, and well ventilated.

3.2.4.1 Cylinder storage area temperatures should not be extreme and should never exceed 125 degrees Fahrenheit.

3.2.5 Charged and empty cylinders should be stored separately.

3.2.6 Upon the arrival of new shipments, cylinders should be rotated so that the older gases are used first.

3.2.7 Cylinders should be grouped by their hazard classification.

3.2.8 Special precaution should be taken to store cylinders away from highly ignitable substances, corrosive materials, and fumes.

3.2.9 Cylinders should not be stored near elevators, walkways, building exits, unprotected platform edges, or in locations where heavy moving objects could hit or fall on them.

3.2.10 All compressed gas cylinders in service or in storage at the users location shall be secured to prevent falling/tipping/rolling, and they shall be stored and used with the valve-end extended upward.

3.2.11 Cylinders can be secured with straps or chains connected to a wall bracket or other fixed surface, or by use of a cylinder stand.

3.3 Transportation of Cylinders:

3.3.1 Users of compressed gas cylinders shall ensure that they are not dragged in an upright position or dragged or rolled in a horizontal position.

3.3.2 A suitable hand truck, forklift, or similar material handling device designed for cylinder transport should be used.

3.3.2.1 One must ensure that the container is properly secured to the device.

3.3.3 Personnel should take cautious measures to ensure that the handled cylinders do not strike against each other or other surfaces.

3.3.4 Dropping or striking may damage the cylinder valve, which could turn the cylinder into a dangerous torpedo with the potential to injure personnel, or damage property.

3.3.5 Never lift a cylinder by the cap.

3.3.6 Personnel transporting gas cylinders must be familiar with the hazards associated with the gases they handle and they must know what to do in the event of a release.