

1.1 PURPOSE

- 1.1.1 The purpose of this program is to cover general procedures for the safe handling of compressed gas cylinders and provide recommended safe practices for the storage and transport of cylinders for TERRY R PITT CONSTRUCTION employees.

1.2 RESPONSIBILITIES

1.2.1 Supervisor

- 1.2.1.1 Inform and ensure that all employees are following the safe handling procedure set forth in this document at all TERRY R PITT CONSTRUCTION worksites.

1.2.2 Safety Department

- 1.2.2.1 Develop written compressed gas cylinder program and revise the program as necessary
- 1.2.2.2 Develop a training program on the safe handling, use, storage, and transportation of compressed gas cylinders

- 1.2.2.3 Conduct routine inspections to ensure the proper storage and use methods are followed

1.2.3 Employee

- 1.2.3.1 Attend training as necessary
- 1.2.3.2 Comply with the procedures outlined in this program
- 1.2.3.3 Inform a supervisor of any problems, defective equipment, or lack of proper storage space for compressed gas cylinders

1.3 GENERAL

- 1.3.1 Employees must be trained on the proper use, handling, and storage of compressed gas cylinders.

- 1.3.2 When a gas cylinder is received, it will be checked for the following:

- 1.3.2.1 A stamped hydrostatic test date within the last five years
- 1.3.2.2 A stenciled or labeled identification of its contents
- 1.3.2.3 Presence of a valve protection cap

- 1.3.3 Only use manufacturer-approved tools provided by the supplier to open and close cylinder valves.

- 1.3.3.1 Cylinders should be capped when they are not being used.

- 1.3.3.2 When a cylinder becomes empty then it should be marked and dated. Empty cylinders must be handled as carefully as full cylinders.

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- 1.3.4 Before using any compressed gas cylinder, be familiar with the respective SDS.
- 1.3.5 Never use adapters to fit valves to cylinders or regulators to valves.
- 1.3.6 Regulators are gas specific and generally not interchangeable. Make sure the regulator and valve fittings are compatible. Never mix gases in a cylinder and only professionals should refill cylinders.
- 1.3.7 Cylinders will be kept far enough away from the actual welding or cutting operations so that sparks or hot flames will not reach them. When this is impractical, fire resistant shields will be provided.
- 1.3.8 Cylinders containing oxygen or acetylene or other fuel gas will not be taken into confined spaces.

1.4 IDENTIFICATION AND LABELING

- 1.4.1 The content of compressed gas cylinders will be clearly identified on the cylinder by means of stenciling or stamping on the cylinder or affixed with a label. No compressed gas cylinder should be accepted for use that does not legibly identify its content by name. Compressed gas cylinders will have the name of the substance they contain in letters at least one-inch high which may be either painted on the manifold or on a sign permanently attached to it.
- 1.4.2 All compressed gases received, used, or stored must be labeled according to DOT and OSHA regulations. Each cylinder must be marked by label or tag with the name of its contents. Such identification should be stenciled or stamped on the cylinder or placed on a label. Do not accept cylinders without the appropriate labels. The primary identifier of cylinder contents is the label.
- 1.4.3 Never rely on the color of the cylinder for identification. Cylinder colors may vary depending on the supplier. Labels on caps have little value because caps are interchangeable.
- 1.4.4 Always read the label. No compressed gas cylinder should be accepted for use that does not legibly identify its contents by name. If the contents cannot be identified, the cylinder should be marked *contents unknown* and returned to the manufacturer.
- 1.4.5 All gas lines leading from a compressed gas supply should be clearly labeled to identify the gas.

1.5 INSPECTION

- 1.5.1 To ensure a safe condition, all cylinders and caps will be visually inspected prior to use and following use. Damage or malfunctioning parts will be reported immediately to the supervisor.
- 1.5.2 Cylinders must be equipped with the correct regulators. These regulators and the cylinder valves will be visually inspected prior to and after use. At a minimum, the inspection should include:
 - 1.5.2.1 Condition of regulator protective shield
 - 1.5.2.2 Buildup of grease, oil, dirt, and solvents
 - 1.5.2.3 Condition of the gas hose and connections

1.6 HANDLING AND USE

- 1.6.1 Precautions must be taken for care and maintenance of cylinders. There are two types of hazards associated with the use, storage, and handling of compressed gas cylinders: the chemical hazard associated with the cylinder contents (corrosive, toxic, flammable, etc.) and the physical hazards represented by the presence of a high-pressure vessel. As a minimum, a back flow preventer shall be installed on the torch end of the hose.
- 1.6.2 Compressed gas cylinders should only be handled by those familiar with the hazards and who understand how to safely handle, transport, and store compressed gas cylinders.
- 1.6.3 Ensure all cylinders are properly labeled as to the contents.
- 1.6.4 Move cylinders using a suitable hand truck or cart.
- 1.6.5 Cylinders must be transported, stored, and used upright (with the valve up) and must be securely fastened to prevent them from falling or being knocked over. Suitable racks, straps, chains, or stands are required to support cylinders. The only exception to the upright position is when, if necessary, for short periods of time, cylinders are actually being hoisted or carried.
- 1.6.6 Cylinder valves are to be protected with the standard cap when not in use (empty or full). Regulators are to be protected with covers where there is a likelihood of damage.
- 1.6.7 Acetylene or other flammable gas cylinder valves should not be opened more than 1/2 a turn of the spindle, and preferably no more than 3/4 of a turn. This reduces the risk of explosion and allows for the cylinder valve to be closed quickly cutting off the gas flow.
- 1.6.8 Never use oxygen or other compressed gases as a substitute for compressed air to run pneumatic tools, in oil heating burners, to start internal combustion engines, to blow out pipelines, or to create pressure for ventilation.
- 1.6.9 Oxygen cylinder valves should be opened all of the way during use.
- 1.6.10 Do not use acetylene at operating pressures above 15 psi.
- 1.6.11 Purge fuel and oxygen hoses individually before lighting up a torch tip.
- 1.6.12 Never force a cap or regulator. The cap should only be hand tight. When a cylinder cap cannot be removed by hand:
 - 1.6.12.1 Only a company approved competent person may attempt to remove the cap.
 - 1.6.12.2 If a competent person is not available the cylinder will be tagged *Do Not Use* and returned to the designated storage area, for return to vendor.
- 1.6.13 Cylinders should not be exposed to excessive dampness, or to corrosive chemicals or fumes.

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- 1.6.14 Cylinders are not to be exposed to temperature extremes or stored in the vicinity of combustibles.
- 1.6.15 Gases are not to be transferred from one vessel to another (except dry ice and cryogenic materials). Do not try to refill a compressed gas cylinder.
- 1.6.16 Disposable gas cylinders, including lecture bottles, will not be refilled. It is against DOT regulation to refill or reuse a disposable gas cylinder.
- 1.6.17 Never use a cylinder without a regulator. Always use the correct pressure regulator.
- 1.6.18 After attaching the regulator and before the cylinder is opened, check the adjusting screw of the regulator to see that it is released. Never permit the gas to enter the regulator suddenly.
- 1.6.19 Never try to stop a leak between a cylinder and regulator by tightening the union nut unless the valve has been closed first.
- 1.6.20 Never strike an electric arc on a cylinder.
- 1.6.21 Never use a leaking, corroded, or damaged cylinder. Leaking cylinders will be moved to an isolated, well-ventilated area, away from ignition sources. Soapy water should be used to detect leaks. If the leak is at the junction of the cylinder valve and cylinder, do not try to repair it. Remove the cylinder from service and contact the supplier for return/response directions.

1.7 STORAGE

- 1.7.1 Because of the high internal pressure in compressed gas cylinders, they can become projectiles if stored in a manner that could damage the valve. Leaking cylinders can also cause an atmospheric hazard or create an oxygen deficient atmosphere. Due to the hazards associated with compressed gas cylinders, the following rules for storing compressed gas cylinders will be followed at all times.
 - 1.7.1.1 Cylinders must be secured at all times in such a way as to avoid them being knocked over or damaged, must be stored in a vertical position, not stored in public hallways, and segregated based upon contents. Group and store compressed gases based on their hazard class.
 - 1.7.1.2 Cylinders containing flammable gases must not be stored in close proximity to open flames, areas where electrical sparks are generated, or where other sources of ignition might be present.
 - 1.7.1.3 Oxygen cylinders, full or empty, should never be stored in the same vicinity as flammable gases or combustible materials (especially oil or grease). Proper storage of oxygen cylinders requires a minimum of 20 feet between flammable gas cylinders or the areas need to be separated, at a minimum, by a firewall 5 feet high with a fire rating of at least one-half hour.

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- 1.7.1.4 Inside of buildings, cylinders must be stored in a well-protected, well-ventilated, dry location, at least twenty feet from highly combustible materials such as oil or excelsior. Cylinders should be stored in definitely assigned places away from elevators, stairs, or gangways. Assigned storage places must be located where cylinders will not be knocked over or damaged by passing or falling objects, or subject to tampering by unauthorized persons. Cylinders must not be kept in unventilated enclosures such as lockers and cupboards.
- 1.7.1.5 Greasy and oily materials must never be stored around oxygen cylinders and fittings must never be greased or oiled.
- 1.7.1.6 Always store cylinders in an upright position, on a level floor, and secure them using a restraint such as chains, sturdy straps, or plastic coated wire or attach the cylinder to a non-tip base.
- 1.7.1.7 Restraints must be fastened on the upper half of the cylinder – above the center of gravity.
- 1.7.1.8 Cylinders will not be kept in unventilated enclosures such as lockers and cupboards. Storage areas should be dry, well drained, ventilated, and fire-resistant.
- 1.7.1.9 Empty and full or partially full cylinders should be stored in separate areas. Designated storage areas for full and empty cylinders must be identified and labeled and must not be near elevators, stairs, or gangways.
- 1.7.1.10 Cylinders must be protected from damage, corrosion, sunlight, and kept away from heat sources. Do not subject cylinders to temperature extremes.
- 1.7.1.11 Hoses and connection should be stored in a cool dry area and protected from damage. Regular inspections of hoses and connections should be conducted to check for damage.
- 1.7.1.12 Cylinders will not be stored in hallways, paths of egress, stairways, or other high traffic areas.
- 1.7.1.13 Cylinders not in use will have the valve closed and valve cap in place.
- 1.7.1.14 Stored cylinders should be visually inspected on a routine basis for any indication of leakage or other problems.
- 1.7.1.15 Store out of direct sunlight and away from sources of heat and ignition; temperatures shall not exceed 125°F.
- 1.7.1.16 Cylinders shall be stored where they are protected from the ground to prevent rusting.

1.8 TRANSPORTATION

- 1.8.1 Cylinders that contain compressed gases are primarily shipping containers and should not be subjected to rough handling or abuse. Such misuse can seriously weaken the cylinder and render it unfit for further use or turn it into a rocket having sufficient thrust to drive it through masonry walls.

1.8.2 When transporting compressed gas cylinders, the following rules will be followed at all times.

1.8.2.1 Ensure cylinders are properly labeled as to the contents.

1.8.2.2 Regulators will be removed and valve protection caps put in place before the cylinder is moved.

1.8.2.3 Cylinder caps or the neck of a cylinder will not be used for lifting purposes.

1.8.2.4 Do not subject cylinders to rough handling or abuse. Cylinders should not be dropped or permitted to strike violently and protective caps are not used to lift cylinders.

1.8.2.5 Cylinders should only be transported in freight/cargo elevators only, not on passenger elevators.

1.8.2.6 Secure and move cylinders with a suitable hand truck, lift truck, or crane with a cradle or platform.

1.8.2.7 Secure cylinders with a strap or chain when using a designated cart. Only one cylinder should be handled at a time unless a two-cylinder cart is used and each cylinder is restrained separately.

1.8.2.8 Cylinders must be transported in a vertical, secured position using a cylinder basket or cart. Never roll or drag a cylinder when transporting.

1.8.2.9 Rolling of compressed gas cylinders as a means of transportation is prohibited. Regulators shall be removed from cylinders and cylinders shall be capped prior to movement.

1.9 REMOVING A CYLINDER FROM SERVICE

1.9.1 Do not completely empty the cylinder; always leave some residual pressure.

1.9.2 If the cylinder is empty, replace the cap and remove it to the empty cylinder storage area.

1.9.3 Label all empty cylinders with tags so that everyone will know their status. Empty cylinders can be marked with the word “Empty” and dated with a tag.

1.9.4 Handle empty cylinders as carefully as full ones; residual pressure can be dangerous.

1.10 TRAINING

1.10.1 Employees affected by this program will be trained on compressed gas cylinder safety. Training will include:

1.10.1.1 Cylinder identification

1.10.1.2 Cylinder inspection

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- 1.10.1.3 Cylinder handling, storage, and use
- 1.10.1.4 Cylinder transportation
- 1.10.1.5 Hazards and safe work practices

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