

Compressed Gas Plan

Purpose

It is the policy of EMA to permit only trained and authorized employees to handle, store, use, and inspect compressed gases and equipment at any time. This policy is applicable to daily users and those who only occasionally have cause to use the equipment.

This written Compressed Gas Plan describes methods and practices for care and use of compressed gases that can be read and understood by all managers, supervisors, and employees at EMA. This written plan is intended to be used to:

- create an awareness of the hazards among our workforce,
- standardize procedures for use and care of the equipment,
- provide a consistent format for training employees on the proper procedures to be used,
- minimize the possibility of injury or harm to our employees, and
- demonstrate EMA 's compliance with OSHA's compressed gas requirements.

Administrative Duties

The Project Manager is responsible for implementing and maintaining this written Compressed Gas Plan. The Project Managers are solely responsible for all facets of the plan and have full authority to make necessary decisions to ensure the success of this plan. The Project Manager are qualified, by appropriate training and experience that is commensurate with the complexity of the plan, to administer or oversee our compressed gas safety program and conduct the required evaluations.

This written Compressed Gas Plan is kept at the corporate office and in the written Safety & Health Program.

If, after reading this plan, you find that improvements can be made, please contact the Project Manager. We encourage all suggestions because we are committed to creating a safe workplace for all our employees, and a safe and effective compressed gas safety program is an important component of our overall safety plan. We strive for clear understanding, safe work practices, and involvement in the program from every level of the company.

Personal Protective Equipment

We have assessed the hazards associated with the compressed gases and equipment at EMA and have taken measures to eliminate or reduce their presence with engineering and administrative controls. Where these controls were not enough for employee protection, our company provides all necessary personal protective equipment according to both our written respirator and personal protective equipment (PPE) programs. See the respirator program for details about respirator selection, training, inspection, cleaning, maintenance, storage, work area surveillance, program evaluation, user physical fitness determination, and air quality standards. See the PPE program for details about hazard assessments, PPE selection, employee training, PPE cleaning and maintenance, and PPE-specific information.

Inspection Procedures

The Project Manager is qualified to determine that compressed gas cylinders at the company are in a safe condition to the extent that can be determined by visual inspection.

Inspections of cylinders are conducted on a frequent and periodic schedule.

Our inspections are conducted as prescribed by the following, as applicable:

- 49 CFR 171 - 179 and 49 CFR 103 (Hazardous Materials Regulations under the Department of Transportation).
- Compressed Gas Association Pamphlet C-6-1968 (Standards for Visual Inspection of Steel Compressed Gas Cylinders).
- Compressed Gas Association Pamphlet C-8-1962 (Standard for Requalification of DOT-3HT Seamless Steel Cylinders).

Of course, if a cylinder is found to be unfit in its present condition, then the Project Manager must determine whether it can be repaired or must be scrapped. If a cylinder is repaired, it can only go back into service if the defect is corrected as specified according to the requirements listed above.

Handling Procedures

Compressed gases are considered to be handled when employees perform any of the following activities:

- identify contents;
- fill, transfill, change gas service, maintain and move containers; and
- connect containers and withdraw content.

We follow the safe handling procedures found in the CGA pamphlet series, including the P-1-1991 pamphlet. Our handling procedures include the following:

- Identify a gas and its dangers before using it. Look for this information on labels, MSDS's, and cylinder markings. If you don't know what's in a cylinder, don't use it.
- Examine cylinders as soon as you receive them. If you detect signs of damage or leakage, move them to a safe, isolated area and return them to the supplier as soon as possible.
- Use only regulators, pressure relief devices, valves, hoses, and other auxiliary equipment that is designed for the specific container and compressed gas/cryogenic liquid to be used.
- Do not interchange equipment between different types of gases.
- Make sure valves, hoses, connectors, and regulators are in good condition. Don't use cylinders without them.
- Use pressure relief devices and safety devices to help maintain cylinder or system pressure at the desired levels. (Exceeding the desired pressure could damage the cylinder or system.)
- Check to see if regulators, hoses, and gauges can be used with different gases. Assume they cannot.
- Never open valves until regulators are drained of gas and pressure-adjusting devices are released. When opening cylinders, point outlets away from people and sources of ignition, such as sparks or flames. Open valves slowly. On valves without hand wheels, use only supplier-recommended wrenches. On valves with hand wheels, never use wrenches.
- Do not tamper with connections and do not force connections together.

- Do not hammer valves open or closed.
- Do not drop, bang, slide, clank, or roll cylinders.
- Cylinders may be rolled along the bottom rim.
- Don't let cylinders fall or have things fall on them.
- Don't lift a cylinder by its cap unless using hand trucks so designed.
- Use carts or other material handling equipment to move cylinders. Use ropes and chains to move a cylinder only if the cylinder has special lugs to accommodate this. Some cylinders may require special hand trucks.
- Keep cylinders secured and upright. (But never secure cylinders to conduit carrying electrical wiring.)
- When transporting compressed gas cylinders, be sure the vehicle is adequately equipped to haul compressed gases safely. Stop the engine while loading or unloading flammable compressed gases.
- Don't drive a vehicle hauling liquefied hydrogen through a tunnel.
- Know accident procedures.

Storage Procedures

The following activities are involved in safely storing compressed gases:

- post areas where gases are present,
- group gases,
- separate combustibles,
- avoid corrosives or areas where container damage can occur,
- position containers properly, and
- use indoor and outdoor storage appropriately.

We follow the safe storage procedures found in the CGA pamphlet series, including the P-1-1991 pamphlet. Our storage procedures for compressed gases include the following:

- Store cylinders upright.
- When a cylinder is in storage, keep the steel protective cap screwed on. This step reduces the chance that a blow to the valve will allow gas to escape.
- Group cylinders by types of gas.
- Store full and empty cylinders apart.
- Store gases so that old stock is removed and used first.
- To keep cylinders from falling over, secure them with chains or cables.
- Store compressed gas containers in dry, well-ventilated areas away from exits and stairways. If outside, store containers off the ground and out of extremely hot or cold environments.
- Do not store compressed gas containers in high pedestrian and vehicle traffic areas. (Containers are more likely to be damaged there.)
- Store oxygen cylinders at least 20 feet from flammables or combustibles or separate them by a 5-foot, fire-resistant barrier.
- Keep oil and grease away from oxygen cylinders, valves, and hoses.
- If your hands, gloves, or clothing are oily, do not handle oxygen cylinders.
- Make sure fire extinguishers near the storage area are appropriate for gases stored there.
- Post signs stating the name(s) of gas present and NO SMOKING where gases are stored.

Usage Procedures

Safe use of compressed gases involves the following activities:

- properly handle leaking containers,
- prevent abuse,
- identify contents,
- properly use container and valve caps and plugs, and
- return empty containers.

We follow the safe usage procedures found in the CGA pamphlet series, including the P-1-1991 pamphlet. Our procedures for using compressed gases include the following:

- Remove any leaking containers to a well-ventilated area and post a warning of the hazard.
- Shut a leaking valve and tighten the valve gland or nut. Then try opening the valve; if it still leaks, close it and tag the container unserviceable.
- Make sure labels are legible before using containers; otherwise, return the containers to the supplier.
- Do not misuse containers (i.e., using them for support); only use them as they were intended.
- Keep containers away from fire, sparks, and electricity.
- Don't smoke or allow others to smoke in the vicinity of flammable compressed gas containers.
- Do not subject containers to extreme heat or cold.
- Use a respirator or SCBA (self-contained breathing apparatus) according to 29 CFR 1910.134 when using toxic compressed gas.
- Contact the manufacturer/supplier with questions about safe handling.
- Always keep removable caps and valve outlet caps/plugs on containers except when connecting to dispensing equipment.
- Do not use oxygen and compressed air interchangeably. They are not the same.
- Comply with ANSI Z49.1 when using or storing oxyfuel-gas containers for welding and cutting and other similar activities.
- When empty, close and return cylinders. Empty cylinders must be marked MT or Empty. Empty acetylene cylinders must be so labeled.
- Be sure valves are closed when not using the container and before returning containers. Properly label returning containers.
- Do not refill non-refillable containers once they are empty.

Gas-Specific Safety Procedures

EMA complies with the following gas-specific procedures:

General requirements for gases such as chlorine, sulfur dioxide, and nitrogen, in 29 CFR 1910.101.

Acetylene requirements in 29 CFR 1910.102.

Hydrogen gas requirements in 29 CFR 1910.103.

Liquid hydrogen requirements in 29 CFR 1910.103.

Oxygen gas requirements in 29 CFR 1910.104.

Liquid oxygen requirements in 29 CFR 1910.104.

Nitrous oxide requirements in 29 CFR 1910.105.

Anhydrous ammonia compressed gas requirements in 29 CFR 1910.111

Compressed Gas Emergency Procedures

In an emergency, the Project Manager may seek advice from the Chemical Transportation Emergency Center, known as CHEMTREC, which can be reached 24 hours a day by dialing (800) 424-9300. This service is provided by the Chemical Manufacturers Association. A similar Canadian service, CANMTEC, is available at (613) 996-6666.

Refer to our written emergency action plan for employee escape procedures and assignments during a compressed gas emergency.

Training Program

The Project Managers are responsible for training personnel who will handle, store, or use a compressed gas. Under no circumstances will an employee handle, store, or use a compressed gas until he/she has successfully completed this company's compressed gas training program. This includes all new workers who will handle, store, and use compressed gases, regardless of claimed previous experience.

General training elements include the following:

- Compressed gases and equipment at the company.
- Hazards of compressed gases and equipment at the company.
- Personal protective equipment.
- Inspection procedures.
- Handling procedures.
- Storage procedures.
- Usage procedures.
- Gas-specific safety procedures.
- Compressed gas emergency procedures.

Record keeping

The Project Manager is responsible for maintaining records of individuals trained and certified for handling, storage, and use of compressed gases and equipment. These records are kept at EMA's corporate offices.

Disciplinary Procedures

Constant awareness of and respect for compressed gas safety procedures and compliance with all safety rules are considered conditions of employment. Project Managers reserve the right to issue disciplinary warnings to employees, up to and including termination, for failure to follow the guidelines of this compressed gas safety program.

Program Evaluation

Although we may not be able to eliminate all problems, we try to eliminate as many as possible to improve employee protection and encourage employee safe practices. Therefore, the Project Manager is responsible for evaluating this written plan. The evaluation will include a review of reported accidents, as well as near misses, to identify areas where additional safety measures need to be taken.

The effectiveness of the program could also be reviewed by conducting:

- a walk-through of the facility, and
- interviews with employees to determine whether they are familiar with the requirements of this program and if safety measures are being practiced.