



**Portland Community
College
Health & Safety Manual**

Dept: **Environmental Health and Safety (EH&S)**

Function: **Facilities Management Services**

Topic: **Chapter 27: Compressed Gas Safety Plan**

Board Policy: B507

Effective Date:
June 2022

Authority	PCC Board Policy—B507
	Portland Community College is committed to providing a safe and healthy work and educational environment for our employees, students and visitors.

Summary	This Compressed Gas Safety Plan (the Plan) establishes minimum safe work practices that will prevent the employee exposure to the potential physical and health hazards associated with using compressed gases. This Plan is applicable to all employees at Portland Community College (PCC). This Plan is intended to allow PCC to maintain compliance with Oregon OSHA’s regulations regarding the storage, handling and use of compressed gases.
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I. PURPOSE

Portland Community College (PCC) is committed to providing its employees and students an environment that is free from recognized hazards. PCC recognizes the potential physical and health hazards of compressed gases and is establishing this Plan to define minimum requirements for the safe storage, use, and handling of compressed gases throughout the District.

The Plan outlines the hazards associated with the use, storage, transportation and disposition of compressed gases and/or the containers and systems in which they are held. The Plan includes procedures that employees must follow to minimize their exposure to such hazards and prevent workplace accidents. This Plan does not cover natural gas, hot water or other utilities available throughout PCC.

II. AUTHORITY

- OAR Chapter 437, Division 2/H Hazardous Materials
- OAR Chapter 437, Division 2/M Compressed Gas & Compressed Air Equipment
- OAR Chapter 437, Division 2/Z Hazard Communication
- 49 CFR 173.6 DOT Materials of Trade (MOT)
- Compressed Gas Association (CGA) guideline

III. RESPONSIBILITY

A. Department Managers are responsible for:

- Establishing and implementing department specific procedures for handling and using compressed gases
- Assigning and/or facilitating appropriate training to affected employees and assessing when retraining is necessary
- Completing Personal Protective Equipment (PPE) assessments and assignments for work tasks involving compressed gas containers
- Ensuring periodic inspections of compressed gas use and storage areas are completed and any issues are corrected

B. Affected Employees are responsible for:

- Performing all work with compressed gases in accordance with this Plan and department specific procedures
- Coordinating with vendors for the safe delivery and pick up of compressed gas containers
- Completing appropriate safety training before working with compressed gases
- Wearing appropriate PPE when using or handling compressed gas containers

C. Environmental Health & Safety (EH&S) is responsible for:

- Maintaining, amending and reviewing this Plan
- Assisting and/or advising departments regarding the care and handling of compressed gas containers and gas systems

- Maintaining hazardous waste manifests from waste disposal activities that include waste compressed gas containers

D. Facilities Management Services (FMS) is responsible for:

- Maintaining building mounted compressed gas container brackets and other devices used to secure compressed gas containers
- Maintaining compressed gas/air distribution systems
- Maintaining leak detection equipment for compressed gas systems in work areas controlled by FMS employees

E. Project Managers are responsible for:

- Informing contractors of PCC's expectations for compressed gas use, handling, and storage
- Ensuring proper compressed gas container storage and/or piping is incorporated into designs for new or renovated spaces where compressed gases will be used

F. Public Safety is responsible for:

- Responding to release events of compressed gases according to the procedures established in *Chapter 7 - Hazardous Material Emergency Response*

G. All Employees are responsible for:

- Ensuring that work is performed safely in areas where compressed gases are used
- Reporting any incidents or near misses that occur at a PCC facility

IV. PROCEDURES

A. General Safety

- 1. Properties of Compressed Gases** include: high pressure, ease of diffusion, low ignition points for flammable gases, low boiling points, and in some cases, a lack of visual and/or odor detection.
- 2. Types of Compressed Gases**
 - a. Liquified** – These are gases that can become liquids at normal temperature when they are stored inside cylinders under pressure. Inside the cylinder, they exist in a liquid-vapor equilibrium. Examples include: chlorine, carbon dioxide, anhydrous ammonia, liquified nitrous oxide, liquified petroleum gas (LPG), etc.
 - b. Non-liquified** – These gases do not become liquids when they are compressed at normal temperatures or very high temperatures. Examples include: nitrogen, oxygen, air, helium, argon, etc.
 - c. Dissolved** – These are gases dissolved in a liquid phase solvent. Dissolved gas cylinders are packed with an inert, porous filter saturated with the solvent with stabilizes the volatile gas. These gases are very unstable. A common

example of this type of gas is acetylene and the stabilizing solvent used is acetone.

- 3. Hazards of Compressed Gases** – There are many physical and health hazards associated with compressed gases. Some compressed gases are toxic, e.g., ammonia and chlorine; other compressed gases are corrosive, e.g., ammonia chloride and hydrogen chloride; other compressed gases are flammable, e.g., hydrogen and acetylene; compressed gases can also be oxidizing, e.g., oxygen and nitrous oxide). Additionally, some compressed gases are chemically inert yet pose a risk of asphyxiation due to their ability to displace available oxygen and create an oxygen deficient atmosphere. Finally, some compressed gases may have more than one hazard and can contribute to other hazards such as toxic or explosive atmospheres. For more information on these chemical hazard classifications, see *Appendix A: Definitions*.
- 4. Compressed Gas Container Types** - Compressed gas containers come in many different sizes depending on their use and type. For example, there are small containers such as aerosol cans, lecture bottles and MAPP gas. Larger portable containers are used for holding fuel for cooking or powering vehicles. Still larger sizes come in the form of cylinders for laboratory instrumentation or for use with welding or cutting. In some situations, large volumes of compressed gas can be found in specialized tanks, e.g., liquid propane. Compressed air systems for use as either shop air or breathing air will allow for the delivery of compressed air via ductwork or hoses that ultimately flow from an air compressor or manifold, often in a remote location away from the work environment where the air is clean. The containers and ductwork that house compressed gases can also pose a hazard due to the high pressure under which the gases are maintained.
- 5. Incompatibility** - Some compressed gases are incompatible with other gases, chemicals, or work operations. Departments must ensure they are working with and storing compressed gases in a way to prevent contact with incompatible situations. An example of such incompatibility would be storing oxygen with fuel gases such as acetylene or propane or with combustible or flammable liquids.
 - a. Chemicals** - Chemical incompatibility information for each chemical can be found in the products Safety Data Sheet (SDS). For information on PCC's SDS inventory management system and accessing SDSs, see *Chapter 8 - Hazard Communication Program*. For general information about compressed gas compatibility, see *Appendix B: Compatibility Chart*.
 - b. Work Operations** – Consider the following based upon the type of compressed gas used and its chemical or physical hazards:
 - Use non-sparking tools when working with flammable or combustible gases
 - Never use a compressed gas in a confined space

Consult the SDS for the specific compressed gas to be used to determine or verify any precautions that must be observed or taken when using the compressed gas.

6. **Personal Protective Equipment (PPE)** - Employees handling compressed gas containers must wear the appropriate PPE for their work tasks and the gases or chemicals they are working with. This may include eye protection, foot protection, face protection, gloves, or protective clothing. PPE determinations are made by the department's supervisor and should be documented on the department's PPE Assessment. More information on PPE, see *Chapter 12 - Personal Protective Equipment*.
7. **Additional Information** - Specific information regarding the properties or hazards of any individual compressed gas, stored or in use, as well as recommended/required PPE, can be found on the product's SDS.

B. Identification – The contents of each compressed gas containers must be identified.

1. **Labels, Markings or Stencils** - A durable label, marking or stencil should be provided on each container and should not be readily removable. Wherever practical, the marking should be located on the shoulder of the cylinder, not on the cap. Color coding of cylinders is not a reliable means of identifying a container's contents as colors may vary between suppliers. Labels, markings or stencils should include the chemical name or trade name of the gas, its hazard classification, precautionary statements of the chemical, and the manufacturer's contact information.
2. **Stamps or Etchings** - Compressed gas cylinders should be stamped or etched with information about the tank test date and in some cases the testing method. Any department that will be purchasing compressed gas cylinders should be aware of the testing requirements and timeline for any cylinders they own. If a department will be renting compressed gas cylinders, the vendor/supplier completes this testing.
3. **Other** - If the labeling, markings, or stamps on a compressed gas container become unclear or are defaced so that the contents cannot be identified, the container should be marked "contents unknown" and set aside for disposition.

C. Receiving

1. **Small containers** – Aerosol containers, MAPP gas and lecture bottles should be delivered directly to the requesting department where they should be inspected, segregated, and placed into storage based on their contents or physical hazards, e.g., flammables should be stored in a flammable storage cabinet.
2. **Portable Tanks and Cylinders** - When receiving cylinders or portable tanks of compressed gas, inspect each cylinder for the required identification and ensure that each cylinder is equipped with a protective cap. Portable tanks should be

equipped with an affixed protective collar. Some compressed gas cylinders have valve outlet caps and plugs. The presence of these should be verified based on the type of gas ordered and the vendor/supplier's description.

If the contents of a compressed gas container are not clearly identified, it should not be accepted and the delivery of such a container should be rejected by the receiving department and returned to the vendor.

D. Storage - All compressed gas containers must be properly stored according to Oregon Occupational Health and Safety Association (OR-OSHA) and National Fire Protection Association (NFPA) requirements with appropriate signage marking the storage location. Signs should indicate the name and hazard class of gases stored within. Storage locations should be safe from vehicular traffic and should not impede routes for access and egress.

1. **General** - Store compressed gases in a level, cool, dry, well-ventilated, fire-resistant area. Store compressed gases away from sources of ignition or excessive heat, away from the direct rays of the sun. Do not expose cylinders or portable compressed gas containers to artificially low temperatures or temperatures in excess of 125 F. Permanently mounted tanks may be stored outdoors.
2. **Separation** – Some compressed gas containers must be separated from others according to their contents. For example, incompatible gases must be separated by either a firewall or an appropriate distance. For general information about compressed gas compatibility and storage requirements, see *Appendix B: Compatibility Chart*. Empty and full containers must be stored separately and departments should use a first in first out inventory method.
 - a. **Firewalls** - When incompatible gases must be stored in close proximity, an appropriately fire-rated, non-combustible wall can be used. Height and depth of the firewall are determined by NFPA, OR-OSHA, and/or county fire marshal requirements.
 - b. **Distance** - If a department chooses not to use a firewall for separating compressed gases, incompatible cylinders must be separated by at regulatorily defined distances, e.g., acetylene and oxygen must be separated by at least 20 feet (ref. OAR 437-002-2102 (1.)(e.)(B.)(v.))
3. **Volume Restrictions** - Aerosol cans and lecture bottles with flammable contents, as well as MAPP gas, are required to be stored as flammable liquids. No more than 60 gallons of Class 1,2 or 3 flammable liquids or more than 120 gallons class 4 flammable liquids may be stored in an appropriately rated storage cabinet for flammable materials.
4. **Utilities** - Compressed gas cylinders should not be stored where they will limit access to disconnects, electrical panels for example, or near heaters.

5. **Maintain Upright** - All cylinders, both full and empty, must be stored upright at all times and securely attached to a wall, bench or other fixed support or appropriate cart by either chains, straps, or in a rack to prevent them from falling or rolling. All securing devices must be constructed of noncombustible, chemical resistant material. When cylinders have not been stored upright appropriate precautions must be implemented. For example, if an acetylene cylinder has been laid down, it must stand upright for the period of time designated by the supplier before it may be used.
 - a. **Restraint Systems** – Single strap systems must be placed to surround the cylinder at approximately 1/2 the height of the cylinder measured from the floor. If a double strap system is used, place the straps at 1/3 and 2/3 the height of the cylinder. Two-point restraint systems are required for all cylinders. Bungee cords, zip ties, ropes or wire are not acceptable means of securing cylinders.
 - b. **Brackets** - Where brackets are used to secure cylinders, they must be compatible with the size of cylinder being restrained and properly fastened to secure the cylinders in place.
 - c. **Racks** - Racks must be properly secured, and the cylinders properly and securely placed within the rack system.
 - d. **Stands** - Stands for cylinders must be stable and cylinders must be properly and securely placed in/on the stands.
6. **Regulators** – Regulators must be removed from cylinders when compressed gases are stored and not in use.
7. **Cylinder Valves** - Keep cylinder valves closed except when the cylinder is being used. Closing the valve isolates the cylinder's contents from the surrounding atmosphere and prevents corrosion and contamination of the valve.
8. **Cylinder Caps** – Valve protection caps must be in place when compressed gas cylinders are in storage. Caps should be placed so that they are hand-tight. Valve outlet plugs that form a gas-tight seal should remain on compressed gas cylinders so equipped.
9. **Emergency Equipment** - Departments should establish emergency procedures specific to the gases and equipment used in their work area and in conformance to PCC's *Emergency Operations Plan* maintained by Public Safety. These procedures should include: who to contact in the event of an emergency involving compressed gases, the location of the nearest emergency equipment, and any special considerations due to the chemical hazards of the gases. Appropriate portable fire extinguishers must be available where flammable gas is stored. In the event of an emergency involving a flammable gas, employees must immediately evacuate the area.

10. Inspections- Compressed gas cylinders and storage areas should be inspected periodically to ensure that cylinders and equipment are in good working order and not damaged. Inspect cylinders for exterior corrosion, denting, bulging, gouges or digs. Damaged or leaking product or equipment should be taken out of service. Departments can use *Form 1: Inspection Checklist* to inspect their work area.

E. Transportation - Any department needing to transport compressed gas containers must ensure the proper material handling equipment is used. Cylinders are heavy and awkward to move and improper handling can result in sprain, strain, falls, bruises or broken bones. Mishandling compressed gases, or their containers, can result in fires, explosions, chemical burns, frostbite, asphyxiation. Safety caps must be in place whenever transporting cylinders and cylinders must remain upright during transportation. Cylinders and portable tanks should never be lifted by their caps. Never drop cylinders or strike them against one another or other surfaces. Avoid dragging or sliding cylinders. Acceptable methods of transportation include:

- 1. Material Handling Devices** - Specially designed carts should be used to move cylinders inside buildings. These carts can either be in the form of hand trucks with an attached cylinder strap, or carts designed to hold welding equipment. Always push cylinder carts, never pull. Never store compressed gases on such carts.
- 2. Rolling** - Rolling cylinders by hand should only be used for the few feet necessary to position the cylinder. Ensure the cylinder is rolled on its bottom edge and never on its side. Maintain two-handed contact with the cylinder at all times.
- 3. Vehicles** - Compressed gases may only be transported from one PCC campus or center to another when they fall under the Department of Transportation Pipeline and Hazardous Materials Safety Administration's Materials of Trade exception and an approved notification of such activity is on file with EH&S. This activity is limited to a minimum number of small containers of compressed gases, such as aerosol cans for automotive servicing or repair performed by Transportation & Parking personnel, or MAPP gas used by FMS Plumbers. When transporting compressed gases, ensure that regulators and associated piping are removed. Ensure valves are in place and closed. The transportation of compressed gas in a personally owned vehicle is prohibited.
- 4. Elevators and Enclosed Areas** - Use a freight elevator whenever possible. If there is no freight elevator available for use, ensure that elevator is not occupied during ascent/descent and personnel are present at each floor to prevent persons from entering the elevator when compressed gases are present.

F. Compressed Air Systems

- 1. Shop Air** – The following requirements apply to all shop air systems:
 - a. No PVC piping in compressed air systems unless it is buried or completely encased in an enclosure of suitable strength and able to provide protection from external damage and deterioration.

- b. The piping for compressed air systems must be properly labeled, marked or stenciled with the words “compressed air”. Labels must be durable and visible.
 - c. Compressed air systems must not be used for cleaning unless the pressure is reduced to less than 30 pounds per square inch (psi) at the nozzle. Chip guards that prevent debris from being blown back on the worker and appropriate PPE appropriate for the cleaning task are also required. Chip guards may either be screens or barriers affixed to the nozzle or diverter valves that form a protective air cone around the nozzle. PPE may include appropriate eye, ear protection, gloves and/or respiratory protection.
 - d. Compressed air piping systems with internal pressures of 30 psi or greater may be used for cleaning provided there is a relief device or air ports within the system that will drop the pressure below 30 psi at the nozzle when the system is dead ended (restricted airflow at the discharge end of the pipe or nozzle). Relief ports at the nozzle or at least two 1/16 inch holes anywhere near the nozzle will usually reduce the pressure below 30 psi.
 - e. Employees are prohibited from pointing compressed air nozzles at any part of their or another’s body regardless of the pressure.
 - f. Employees are prohibited from using compressed air to clean off their clothing that is currently being worn by themselves or others.
2. **Breathing Air Systems** – The following requirements apply to the breathing air systems supporting the Auto Collision Repair shop at Rock Creek and the Fire Protection Technology department at Cascade:
- a. **Compressors** – Compressors used for breathing air systems must be constructed and situated so as to:
 - Prevent entry of contaminated air into the air-supply system;
 - Minimize moisture content to that the dew point at 1 atmosphere pressure is 10 degrees below the ambient temperature;
 - Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. These must be maintained and replaced/refurbished in accordance with the manufacturer’s instructions;
 - Be affixed with a tag indicating the most recent change date and signature of the employee authorized to perform the change.
 - Oil lubricated compressors must be equipped with a high-temperature and/or carbon monoxide alarm. If only a high-temperature alarm is used, the air supply must be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.
 - For compressors that are not oil-lubricated, the department must ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.

- b. **Couplings** – Couplings for breathing air systems must be incompatible with outlets for non-respirable (shop) air or other gas systems. No asphyxiating substances shall be introduced into breathing air lines.
- c. **Breathing Air Quality** – Compressed breathing air must meet Grade D air quality (ANSI G-7.1-1989). Breathable air may only be used when all of the following requirements are met:
 - Oxygen content by volume of 19.5-23.5 percent;
 - Hydrocarbon content of 5 mg/m³ of air or less;
 - Carbon monoxide content of 10 ppm or less;
 - Carbon dioxide content of 1,000 ppm or less; and
 - Lack of noticeable odor

Departments owning/operating such equipment are responsible for collecting air samples and having them analyzed for conformance to the Grade D standard.

G. Use - All compressed gas containers and associated equipment must be used and maintained properly. This includes:

1. **Hoses and Tubing** - Hoses should be inspected before use to ensure they are not damaged:
 - Check for abrasions, cracks, or other indications of the material breaking down. Only use hose material that is compatible with the chemical and pressure properties of the gas being used.
 - Replace old flexible tubing before it deteriorates.
 - Always clamp flexible tubing or hoses with a clamp approved for the maximum allowable pressure that the connection is subject to. Never use wire, which can cut the flexible tubing.
2. **Valves** – The installation of a valve is required to allow gas to flow from the compressed gas cylinder. Valves are the most vulnerable part of a compressed gas cylinder and are often sources of leaks. Consider the following when using valves:
 - Prior to use, inspect valves for damage, foreign objects, and the presence of oil or grease
 - Never use a damaged valve or a valve with questionable integrity.
 - Never lubricate valves or their connections
 - Open valves slowly to control pressure surges; use the cylinder valve to regulate flow or pressure
 - Discontinue using a valve that operates abnormally, i.e., becomes harder to operate or becomes noisy
 - Never drag, lift or move a cylinder using the valve or hand wheel

3. **Regulators** - Never use a cylinder without a regulator. The following apply to the use of regulators on compressed gas systems:
 - Regulators should only be attached to cylinders when the container is in use.
 - Only use regulators approved for the specific gas or chemical.
 - Some regulators use left-hand threaded connectors to prevent use with incompatible gases.
 - Do not force connections or over tighten a connector.
 - Open cylinder valves slowly and carefully after the cylinder has been connected to the process or equipment.
4. **Emergency Equipment** – Departments using compressed gases should consult the SDS for the product they are using to determine what forms of emergency response equipment should be present when the specific compressed gas is used, e.g., fire extinguisher, fire blanket, emergency washing equipment, etc.

H. Refilling Compressed Gas Containers

1. **Bulk / Fixed Tanks** – Propane destined for bulk tank storage is procured from and delivered to PCC by specialized vendors under contract with PCC. Propane tanks are to be filled only by such vendors. Not every PCC location has such a tank.
2. **Vehicle Mounted Tanks** – These tanks can be refilled in one of two ways:
 - a. **Directly from a bulk tank.** In such cases, the employee refilling a tank must:
 - Always inspect the cylinder to be filled and any equipment used to fill the container. Ensure the cylinder to be filled is equipped with a cap and protective collar.
 - Use a hand truck and strap when transporting cylinders within the same PCC campus or center.
 - Remain in attendance during the filling process
 - Know the location of and conditions under which to use the emergency shut-down.
 - Know the location of the nearest fire extinguisher
 - Ensure that there are no ignition sources, plastics, nylon clothing or combustible materials within 25 feet of the point of fuel transfer.
 - b. **Vendor delivery** – Vendors under contract with PCC delivers full propane cylinders/tanks directly to the requesting PCC campus/center location in exchange for empty cylinders/tanks. Departments must arrange for such services on their own. Vehicle operators must be trained to operate and fuel the vehicle which will accept the newly filled tank.
3. **Portable LPG Tanks** – Portable tanks used for cooking, weed control or outdoor heating are supplied by vendors on contract with PCC. Just as with vehicle mounted LPG tanks, portable tanks are typically exchanged for empty tanks.

Departments using such equipment must establish a contract with a vendor and arrange for the delivery or exchange of tanks.

4. **SCBA Cylinders** are to be refilled with Grade D breathing air in accordance with the procedures established by Fire Protection Technology.
5. **Prohibited** – It is unlawful to refill certain compressed gas cannisters or cylinders. Refer to the labels and markings on a compressed gas container to determine whether it should not be refilled.

I. **Refrigerant Recovery** – Only employees or contractors with a valid EPA 608 certification are permitted to work with refrigerant gases such as chlorofluorocarbons (CFCs and HCFCs). This work includes filling applicable equipment with refrigerant and/or recovering refrigerant from equipment during maintenance operations or prior to the disposal of such equipment.

J. **Disposition** – Compressed gases and the container in which they are stored must be disposed of properly. Methods include:

1. **Recovery of Refrigerants** – CFCs and HCFCs are not to be disposed of but rather recovered for future use, surrendered to government agencies, or sold as commodities.
2. **Return to Vendor** - Departments who rent compressed gas containers from a vendor must arrange for the return of empty containers to the vendor that provided them once they are empty or when they will no longer be used. Contact the vendor to obtain guidelines of how to return cylinders.
3. **Scrap Metal** - Compressed gas containers can be disposed of as scrap metal if they are empty and rendered unusable. In the case of aerosol cans, appropriate can puncturing devices must be used before placing the empty container in recycling.
4. **Regulated Waste** - Any container destined for disposal that is not empty, cannot be returned to the vendor, or not able to be rendered unusable must be disposed of as hazardous waste. For more information on the regulated waste process, see *H&SM Ch 21 - Regulated Waste*.

K. **Department Procedures** – Each department using or storing compressed gases should develop standard operating procedures for the specific gas(es) in use as well as the operations involving the gas(es). Procedures should identify recognized hazards, required PPE, required tools, precautions to consider, steps to complete the specific operation and what to do during an emergency. A sample department procedure can be found in *Appendix C: Example Department Procedure*.

L. **Emergencies** – Department's using or storing compressed gases should consult with PCC's *Emergency Operations Plan* maintained by Public Safety when developing emergency procedures. Personnel using compressed gases should know and follow

their department's standard operating procedures for emergencies such as fires and releases. These procedures will likely have a response based on the location of the emergency, any available ventilation, other controls in place, and warning properties of the compressed gases used.

Public Safety should be contacted whenever there is an emergency at PCC. Public Safety can be reached at (971) 722-4444.

M. Other

1. **Chiller Systems** – FMS maintains the internal temperatures of PCC owned buildings in accordance with a set state-wide standard. Chiller systems are a component of a campus or center's HVAC system and often use a compressed gas in the form of a refrigerant in these chillers systems.

Chiller systems are often equipped with a means for detecting leaks or releases of refrigerant. Additionally, the chiller systems are often equipped with alarm systems that are triggered by elevated levels of refrigerant detected by sensors. Alarms may be audible, visual or both. Chiller rooms/enclosures are maintained in a locked configuration for both safety and security. Under no circumstances should employees enter a chiller room/enclosure unless trained and authorized to do so. Should a chiller room/enclosure alarm for any reason, FMS personnel will follow standard operating procedures for responding to the alarm or trouble condition. Specific respiratory protection in the form of atmosphere-supplying respirators may be required in order to enter a chiller room/enclosure while it is under alarm.

2. **Fire Extinguishers** – Many fire extinguishers contain compressed gas either as a fire extinguishing agent or as a propellant used to deliver a fire extinguishing agent. Fire extinguishers are stored/maintained upright and can be bracketed or anchored to a wall or column or they can rest on horizontal surfaces inside a marked cabinet or enclosure. Fire extinguishers are not equipped with safety caps, regulators or valves and are light enough to be picked up and handled by many individuals. Fire extinguishers must be inspected on a regular basis and training is required to operate a fire extinguisher. Fire extinguishers are maintained and inspected by the FMS department. Departments needing a fire extinguisher to support an operation involving flammable or combustible compressed gases should contact FMS.

V. TRAINING

All PCC employees who will be working with compressed gases must be trained in the safe handling and use of such gases. Training will consist of both District-level training facilitated by EH&S as well as more specific department level training for specific compressed gases, systems, and equipment.

- A. **District-level training** – This training will be available through MyCareer@PCC and includes:

- The contents of this Plan

- Hazards associated with compressed gases
- Special storage, use, and handling precautions necessary to control hazards
- General guidance on what should be included in department specific compressed gas procedures
- Emergency response preparations

Employees will require refresher training when there are changes to the types of cylinder systems or equipment used that differs from their previous training or they demonstrate that they have not retained their knowledge of compressed gas safety.

B. Department training - All departments using compressed gases must provide training to their employees that is specific to the hazards and conditions of the substances and equipment used in their work areas. This training must include:

- Contents of the Department specific compressed gas procedures
- Hazards associated with the gases or chemicals used
- Hazards associated with the equipment used in combination with compressed gases
- Department specific emergency response procedures

VI. RECORDKEEPING

A. Training Records:

1. District-level training records will be maintained in Cornerstone, PCC's Learning Management System, located at MyCareer@PCC.
2. Department training records will be maintained by the employee's supervisor in their employee file for the duration of their employment at PCC.

B. Department Procedures – Written procedures developed by departments using or storing compressed gases will be maintained in the department's files in either electronic or printed form.

C. Regulated Waste Documents - Waste manifests from hazardous waste disposal activities will be maintained by EH&S according to recordkeeping requirements stated in *Chapter 21 - Regulated Waste*.

D. Bills of Lading - Documents that demonstrate the purchase and receipt of compressed gases will be maintained by the department that initiated the shipment

E. Completed Form 1: Inspection Checklists – Maintained by the department that uses the compressed gases.