



**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

Issue Date: 02-18-08

Section # 12

Page: 1 of 13

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

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**Compressed Air and Gas Cylinder Safety Program**

<b>Contents</b>	<b>Subpart</b>
<b>Scope/Purpose</b>	<b>A</b>
<b>Background</b>	<b>B</b>
<b>Policy</b>	<b>C</b>
<b>Responsibilities</b>	<b>D</b>
<b>Definitions</b>	<b>E</b>
<b>Training</b>	<b>F</b>
<b>Safe Handling Guidelines</b>	<b>G</b>
<b>Compressed Air Systems</b>	<b>H</b>
<b>Types of Gases</b>	<b>I</b>
<b>Inspections</b>	<b>J</b>
<b>Markings</b>	<b>K</b>
<b>Transportation</b>	<b>L</b>
<b>Storage</b>	<b>M</b>
<b>Cylinder Protection</b>	<b>N</b>
<b>Cylinder Servicing</b>	<b>O</b>

**SUBPART A - SCOPE/ PURPOSE**

The purpose of this safety policy and procedure is to establish guidelines for the protection and safety of Berry Bros. General Contractors, Inc.'s employees who handle and use compressed gases and or compressed air.

**SUBPART B - BACKGROUND**

Compressed gases are typically stored under pressure in metal cylinders. These cylinders are designed and constructed to withstand high pressures. Improper handling and use of compressed gases can result in devastating consequences. This safety policy and procedure provides guidelines for the safe handling and use of compressed gases. It includes provisions for training and presents safe handling guidelines. It also presents the types; uses, inspection, and marking requirements of compressed gas cylinders. Additionally, this safety policy and procedure presents transportation and storage requirements for compressed gas cylinders.



Issue Date: 02-18-08

Page: 2 of 13

Approver: Joe Berry

**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

Section # 12

Doc # SWP - 12

Revision: 2

**Compressed Air and Gas Cylinder Safety Program**

Compressed air powers a wide variety of tools and equipment found throughout the workplace. These tools include handheld sanders and grinders, nail and staple guns, jackhammers, rotary drills and other commonly used tools. Many large machines and process lines use compressed air as a source of power. When used correctly, compressed air is a valuable energy source that helps us do our jobs easier, faster, and safer. When used improperly, compressed air poses serious hazards.

**SUBPART C - POLICY**

It is the policy of Berry Bros. to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or the public. Therefore, compressed gas cylinders and compressed air will not be handled by any employees until they have been trained in the safe use, handling, storage, specific hazards and movement of compressed gas cylinders. When hazards exist that cannot be eliminated, engineering practices, administrative practices, safe work practices, Personal Protective Equipment (PPE), and proper training regarding Compressed Gas/Air Cylinders will be implemented. These measures will be implemented to minimize those hazards to ensure the safety of employees and the public.

**SUBPART D - RESPONSIBILITIES**

**Managers and Superintendents**

- Provide adequate funds for the purchase and repair of compressed gas cylinders and compressed air storage tanks, equipment and related supplies.
- Identify employees affected by this safety policy and procedure.
- Provide proper training to affected employees.
- Ensure compliance with this safety policy as well as proper use and maintenance through the safety auditing process.
- Ensure proper use and maintenance of air compressor storage tanks and equipment.



**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

Issue Date: 02-18-08

Section # 12

Page: 3 of 13

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

Doc # SWP - 12

Approver: Joe Berry

Revision: 2

**Compressed Air and Gas Cylinder Safety Program**

**HS&E / Risk Management Department**

- Provide prompt assistance to managers/division leaders, supervisors, or others on any matter concerning this safety policy and procedure.
- Assist in developing or securing the required training.
- Coordinate with Purchasing Department to ensure all newly purchased compressed gas cylinders equipment and supplies comply with current safety regulations and this safety policy and procedure.
- Provide consultative service and audit assistance to ensure effective implementation of this safety policy and procedure.

**Supervisors**

- Not allow any employee who has not received the required training to handle any compressed gas cylinders.
- Note defective cylinders and tag them for repair.
- Conduct daily inspections of all compressed gas cylinders and equipment under their control or use.
- Ensure compressor storage tanks are inspected every six months
- Provide employees with the proper PPE necessary for doing work with compressed gas/air.

**Employees**

- Comply with all guidelines and procedures of this safety policy and procedure.
- Employees must immediately report any defective or damaged cylinders or equipment to their supervisor.
- Inspect storage tanks prior to use and note any damages or defects
- Inspect all hoses and equipment before connecting to any compressed air system
- Empty manual drains and taps on a regularly scheduled basis



**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

Issue Date: 02-18-08

Section # 12

Page: 4 of 13

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

Doc # SWP - 12

Approver: Joe Berry

Revision: 2

**Compressed Air and Gas Cylinder Safety Program**

**SUBPART E - DEFINITIONS**

**Air Compressor Storage Tank** - Pressurized vessel that stores air generated from an air compressor.

**Compressed Gas (Non-liquefied)** - A gas, other than a gas in solution, which under the charging pressure is entirely gaseous at a temperature of 70° F.

**Cylinder** - A portable compressed gas container, fabricated to or authorized for use by the U.S. Department of Transportation (DOT), or fabricated to Transport Canada (TC) or the "Rules for the Construction of Unfired Pressure Vessels," Section VIII, ASME *Boiler & Pressure Vessel Code*.

**Drain Valve** - A valve that is installed at the lowest point of an air compressor storage tank to provide for the removal of accumulated oil and water.

**Flammable Gas** - A gas that is flammable in a mixture of 13 percent or less (by volume) with air, or the flammable range with air is wider than 12 percent regardless of the lower limit, at atmospheric temperature and pressure.

**Handling** - Moving, connecting, or disconnecting a compressed or liquefied gas cylinder.

**Liquefied Gas** - A gas, which under charging pressure, is partially liquid at a temperature of 20 °C (70 °F).

**Nonflammable Gas** - A gas that does not meet the definition of a flammable gas.

**Oxidizing Gas** - A gas that can support and accelerate combustion of other materials.

**Safety Relief Device** - A device intended to prevent rupture on a cylinder under certain conditions of exposure.

**Storage** - An inventory of compressed or liquefied gases in containers that are not in the process of being examined, serviced, refilled, loaded, or unloaded.

**Toxic Gas** - A gas having a health hazard rating of 3 or 4 defined in NFPA 704, *Standard System for the Identification of the Fire Hazards of Materials*.



**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

Issue Date: 02-18-08

Section # 12

Page: 5 of 13

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

Doc # SWP - 12

Approver: Joe Berry

Revision: 2

**Compressed Air and Gas Cylinder Safety Program**

**Trap** - A device which uses venting head pressure to purge the tank from condensed water.

**Valve Protection Device** - A device attached to the neck ring or body of the cylinder for the purpose of protecting the cylinder valve from being struck or damaged from impact resulting from a fall or an object striking the cylinder.

**Valve Protective Cap** - A rigid, removable cover provided for compressed gas container valve protection.

**SUBPART F - TRAINING**

Employees who use and handle compressed gas cylinders will be trained before initial job assignment and/or job reassignment. Employees will be trained in the safe use, inspection, handling, and storage of compressed gas/air cylinders. Basic Operation of air compressor storage tanks. Maintenance requirements of drains and traps. Identifying damage and defects in storage tanks, hoses or air driven equipment. Refresher training shall be provided at the discretion of the supervisor and can be completed during safety meetings.

**SUBPART G - SAFE HANDLING GUIDELINES**

Serious accidents can result from the misuse, abuse, or mishandling of compressed gas cylinders. Employees assigned to the handling of cylinders under pressure should follow general safe handling guidelines.

**Compressed Air Safe Handling Guidelines**

1. When using compressed air for cleaning, you must use an air nozzle that allows no more than 30 pounds per square inch of pressure. Since most air lines range in pressure from 90 psi to 120 psi, a pressure-reducing nozzle must be used.
2. In addition, a "dead man" switch or constant pressure trigger must be used to stop air flow once the nozzle is released.
3. To reduce this hazard, some air guns are equipped with chip guards or provide an "air curtain" around nozzle to help reduce fly back.



**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

Issue Date: 02-18-08

Section # 12

Page: 6 of 13

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

Doc # SWP - 12

Approver: Joe Berry

Revision: 2

**Compressed Air and Gas Cylinder Safety Program**

4. Safety goggles offer better protection than regular safety glasses. In addition, a face shield should also be worn for complete facial protection.
5. Once you have protected yourself by using an approved nozzle and wearing the proper PPE, you must make sure to protect the other workers in your area.
6. Don't be fooled into thinking that safety nozzles which regulate pressure to 30 psi can be safely used to clean the human body. Even 30 psi is too much pressure for these sensitive areas.
7. As little as 12 pounds of pressure can blow an eye out of its socket. Compressed air entering the mouth can rupture the esophagus with as little as 5 pounds of pressure.
8. When compressed air enters the ear canal, serious damage can occur that may lead to permanent hearing loss.
9. Perhaps the most serious type of air-related injury occurs when compressed air is blown under the skin. Known as an air embolism, this type of injury can be fatal.
10. When an air pocket reaches the heart, it causes symptoms similar to a heart attack. Upon reaching the brain, pockets of air may lead to a stroke.
11. Because compressed air contains small amounts of oil and other contaminants, anytime compressed air is blown under the skin these contaminants enter the body and may cause dangerous infection.
12. The drain valve on air receivers shall be opened and the receiver completely drained frequently and at such intervals as to prevent the accumulation of excessive amounts of liquid in the receiver.

**Compressed Gas Cylinders Safe Handling Guidelines**

1. Accept only cylinders approved for use in interstate commerce for transportation of compressed gases.
2. Do not remove or change the marks and numbers stamped on the cylinders.
3. Cylinders must never be dragged, pushed, or pulled across the floor.
4. Transport cylinders weighing more than a total of 40 pounds (18.2 kg) on a hand or motorized truck, securing them from falling.
5. Keep the cylinders clean and protect them from cuts or abrasions.
6. Do not lift compressed gas cylinders with an electromagnet. Where cylinders must be handled by a crane or derrick, as on construction jobs, carry them in a cradle or suitable platform and take extreme care that they are not dropped or bumped. Do not use slings.



**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

Issue Date: 02-18-08

Section # 12

Page: 7 of 13

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

Doc # SWP - 12

Approver: Joe Berry

Revision: 2

**Compressed Air and Gas Cylinder Safety Program**

7. Do not drop cylinders or allow them to strike each other violently.
8. Do not use cylinders for rollers, supports, or any purpose other than to contain gas.
9. Do not tamper with safety devices in valves or on cylinders.
10. Consult the supplier of the gas when in doubt about the proper handling of a compressed gas cylinder or its contents.
11. Clearly write EMPTY in chalk on empty cylinders that are to be returned to the vendor.
12. Close cylinder valves and replace valve protection caps, if the cylinder is designed to accept a cap.
13. Load cylinders to be transported to allow as little movement as possible. Secure them to prevent violent contact or upsetting.
14. Always consider cylinders to be full and handle them with corresponding care.
15. Securely support compressed gas cylinders at all times. Cylinders must not be left "free-standing" at anytime, e.g., cylinders unloaded from truck to loading dock must be secured until placed on a hand truck for delivery within the building.

**General OXYGEN-ACETYLENE SAFETY Rules**

1. Oxygen and acetylene cylinders should be handled with care, even when they are empty. Rough handling may damage cylinders or cause leakage with the potential danger of fire and explosion.
2. Hoses and connections should be inspected regularly for damage and hoses stored in a cool area.
3. Dented or otherwise damaged cylinders should never be used. These cylinders should be so marked and sent in as soon as possible.
4. All cylinder valves must be closed and the cap replaced before cylinders are returned for refill.
5. Never lift cylinders by the cap and avoid dragging or sliding cylinders.
6. Cylinders should be kept upright except as may be required for handling.
7. Acetylene cylinders should be stored in a vertical position to prevent the separation of the acetone in the bottle.
8. Cylinders should be stored in an upright position in a safe, dry, well-ventilated place. These cylinders should not be stored in a place where they will be exposed to heat from stoves, radiators or direct sunlight.
9. The protective caps should be installed when the bottles are not in use.
10. Oxygen acetylene bottles should be securely fastened to prevent accidental falling. Bottles in use shall be securely fastened at all times.





**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

Issue Date: 02-18-08

Section # 12

Page: 8 of 13

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

Doc # SWP - 12

Approver: Joe Berry

Revision: 2

**Compressed Air and Gas Cylinder Safety Program**

11. Cylinders must be equipped with the correct regulator and should be checked for oil, grease, and fuel oil to assure they are not present and safety valves tested.
12. Never should the contents from one bottle be transferred to another.
13. Oxygen and acetylene cylinders must not be stored together. A minimum distance is 20 feet apart.
14. The use of oxygen or acetylene cylinders as rollers or as supports for any reason is not allowed.
15. Torches and blowpipes should be examined closely for leaky valves, nozzles, and leaky or clogged tips.
16. All torches shall have check valve/flash-back arrestors installed on the torch inlet connections.
17. All O-Rings should be inspected periodically and changed as needed to minimize the possibility of blowback and hose explosion.
18. Before a regulator is removed from a cylinder valve, the cylinder valve shall always be closed and the gas released from the regulator.
19. The hose on oxygen/acetylene bottles should be properly stored when not in use.
20. Hoses should be inspected regularly. The few inches of that part of the hose near the torch that is subjected to the hardest use should be cut off at intervals and the hose reattached.
21. Leaks in the oxygen and acetylene hoses must be repaired immediately.
22. Should a hose catch fire, the valve at the bottle should be closed. No attempt should be made to extinguish the fire by pinching the hose, as this will cause the fire to follow the hand.
23. Always treat compressed cylinders with respect and they will treat you right.
24. Only tools provided by the supplier should be used to open/close cylinder valves.

**SUBPART H - COMPRESSED AIR SYSTEMS**

1. Every compressed air system has a compressor and tank. These come in many different shapes and sizes, but they all have a few common elements.
2. The compressor tank stores the compressed air. To keep from becoming overly pressurized, the tank has a pressure relief valve that bleeds off excess pressure. All safety valves shall be tested frequently and at regular intervals to determine whether they are in good operating condition.





**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

Issue Date: 02-18-08

Section # 12

Page: 9 of 13

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

Doc # SWP - 12

Approver: Joe Berry

Revision: 2

**Compressed Air and Gas Cylinder Safety Program**

3. Never remove the guarding around the belt and shaft of the compressor motor. The motor starts automatically when the air pressure in the tank falls below required levels.
4. Every air receiver shall be equipped with an indicating pressure gauge (so located as to be readily visible) and with one or more spring-loaded safety valves. The total relieving capacity of such safety valves shall be such as to prevent pressure in the receiver from exceeding the maximum allowable working pressure of the receiver by more than 10 percent.

**SUBPART I - TYPES OF GASES**

Compressed gas cylinders are used for a variety of reasons at Berry Bros. These gas cylinders fall into the following categories:

- Flammable
- Toxic and Poison
- Liquid

Pressurized cylinders predominantly used at Berry Bros. are as follows:

- Acetylene, Dissolved
- Argon, Compressed
- Fire Extinguishers with Compressed Gas
- Nitrogen, Compressed
- Oxygen, Compressed

**Note:** Toxic and poison gas cylinders are not used at Berry Bros.

**SUBPART J - INSPECTIONS**

Compressed **gas / air cylinders** must be visually inspected daily for leaks, cracks, etc. This visual inspection will include the cylinder, safety relief devices, valves, protection caps and stems. If a cylinder is thought to be defective, it should be returned to the supplier for replacement. Under no circumstances should employees attempt to repair defective cylinders. Gauges should be checked to ensure that the gas under pressure is not left in hoses when operations are completed.



**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

Issue Date: 02-18-08

Section # 12

Page: 10 of 13

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

Doc # SWP - 12

Approver: Joe Berry

Revision: 2

**Compressed Air and Gas Cylinder Safety Program**

Leaking cylinders should be moved to an isolated, well ventilated area away from ignition sources. Under no circumstances are repairs to be made to the cylinder. Only authorized personnel from the supplier should attempt repairs.

Before using **compressed air equipment**, always inspect it and make sure everything is in good working order. Hoses should be checked carefully for any sign of damage. Air hoses with cracks or other damage should be removed from service. Air fittings and couplings should also be inspected. They should fit tightly into the hose and be clamped securely with an approved machine clamp. If your couplings require locking pins, make sure they are in place before use. Using compressed air with loose or improper fittings can be dangerous and lead to serious injury. If a connection blows out, a hose can begin whipping violently.

**SUBPART K - SUBPART MARKINGS**

For the purpose of identifying the gas content, compressed gas cylinders shall be legibly marked, stenciled, or stamped on the cylinder or affixed with a label with either the chemical or trade name of the gas. Such markings shall be by means of stenciling, stamping, or labeling, and shall not be readily removable. Whenever practical, the marking shall be on the shoulder of the cylinder for easy identification.

**SUBPART L - TRANSPORTATION**

Transporting gas cylinders requires careful consideration and appropriate precautions. These considerations and precautions include:

- Motor vehicle transport of cylinders
- Flammable gas and oxidizer cylinders transport
- Hand truck (dolly) transport of cylinders
- Cylinder transport precautions

**Motor vehicle transport of cylinders** shall only be done with vehicles equipped with racks or other means of securing the cylinders. Cylinders containing liquefied hydrogen or toxic gases shall be transported in open body vehicles. (General information)



**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

Issue Date: 02-18-08

Section # 12

Page: 11 of 13

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

Doc # SWP - 12

Approver: Joe Berry

Revision: 2

**Compressed Air and Gas Cylinder Safety Program**

**Flammable gas and oxidizer cylinders transport** must not be done together nor with poisons or corrosives. However, oxygen and acetylene cylinder joint transport is allowed if:

- The cylinders are transported in the rear truck bed below the cab level.
- Cylinders in the rear truck bed are secured to prevent the cylinders from rolling around and falling out of the truck bed in the event of the vehicle overturning.

Red label, yellow label, white label, green label, or poison label materials are not to be transported on the same load. Poison label materials are not to be transported with food or other items intended for human consumption.

**Hand truck (dolly) transport of cylinders** shall be used for the transfer of compressed gas cylinders from loading areas to shop or other locations.

**Cylinder transport precautions:**

1. Cylinders having the valve protection cover in place while being transported (inter- and intra-building transport).
2. Cylinders not being rolled or lifted by the valve or valve cap for moving.
3. Cylinder valves being shut off and valve caps in place during transit from location to location.
4. Cylinders that are dropped during transit being taken out of service and returned to the supplier for inspection.
5. Cylinders being securely supported at all times during transport.
6. Smoking is prohibited during loading, unloading, and hand transportation of any pressurized cylinders.
7. Secured and moved in an upright position using a cart or cylinder basket.

**SUBPART M - STORAGE**

The storage of compressed gas cylinders requires precautions and following these safety guidelines. These include:

1. Cylinders should be secured in an upright position in a safe, dry, well ventilated place prepared and reserved for the purpose.
2. Cylinders should not be kept in unventilated enclosures such as lockers.



**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

Issue Date: 02-18-08

Section # 12

Page: 12 of 13

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

Doc # SWP - 12

Approver: Joe Berry

Revision: 2

**Compressed Air and Gas Cylinder Safety Program**

3. Cylinders should not be stored in the same area as flammable substances, such as oil and volatile liquids or near sources of heat, such as radiators or furnaces.
4. Cylinders should not be stored near elevators, gangways, stairwells, or other places where they can easily be knocked down or damaged.
5. Cylinders should be stored on a level fireproof floor.
6. Cylinders stored in the open should be protected from contact with the ground and against extremes of weather.
7. Cylinder storage should be planned so that cylinders are used in the order that they are received from the supplier.
8. Empty and full cylinders should be stored separately, with empty cylinders being plainly identified as such to avoid confusion and empty cylinders marked "MT".
9. Empty cylinders should be grouped together that have held the same contents.
10. Cylinders containing oxidizers and flammables shall be separated by twenty feet or a firewall at least 5 feet high and rated for 30 minutes.

**GAS SPECIFIC STORAGE GUIDELINES**

**Oxygen** cylinders should not be stored within 25 feet of highly combustible materials, oil, grease, wood shavings, or cylinders containing flammable gases. (However, for Berry Bros. operations, oxygen and acetylene are typically paired on a common transfer cart for use.) If closer than 20 feet, cylinders should be separated by a noncombustible barrier at least 5 feet tall with a fire-resistance rating of at least 30 minutes.

**Acetylene and liquefied fuel gas** cylinders should be stored with the valve end up. If storage is within 100 feet (30.5 meters) of each other and not protected by automatic sprinklers, the total capacity of acetylene cylinders stored and used inside the building should be limited to 2,500 ft cubed. Acetylene storage areas must be well ventilated and open flames must be prohibited. Acetylene storage rooms should have no other compressed gases.

**Cylinder storage room guidelines:**

- Well ventilated to prevent the accumulation of explosive concentrations of gas.
- No ignition sources.
- Smoking prohibited.
- All permanent wiring in conduit.



**Berry Bros. General Contractors, Inc.  
Corporate Policy Procedure**

Issue Date: 02-18-08

Section # 12

Page: 13 of 13

**(HSE) Health, Safety & Environmental  
Policies and Procedures Manual**

Doc # SWP - 12

Approver: Joe Berry

Revision: 2

**Compressed Air and Gas Cylinder Safety Program**

- Electric lights (portable and fixed) equipped with guards to prevent breakage.
- Electric switches located outside the room

**SUBPART N - CYLINDER PROTECTION**

All gas cylinders with a water capacity of over 30 pounds shall be equipped with a valve protection cap or with a collar or recess to protect the valve. In addition, cylinders shall be maintained with the protective cap in place at all times unless in use.

**SUBPART O - CYLINDER SERVICING**

Cylinder service, modifications or repairs will be performed by an authorized individual other than a Berry Bros. employee. Any damaged or faulty equipment will be repaired or replaced by the service representative. Cylinder valve caps that cannot be opened by hand will not be forced open with tools and will be returned to the supplier for service and marked "DO NOT USE".

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Approved By: Safety Committee

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