



COMPANY HEALTH & SAFETY PROGRAM

Issue: A
Date: 4/20/2009
Rev: 3
Date 12/5/17
Authorized: MJM

Title: Welding & Cutting

Section No: 45

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1.0 **PURPOSE**

The purpose of this section is to heighten employee awareness of potential welding and cutting hazards, and to communicate acceptable work practices. It is intended that supervisors enforce safe work practices in order to keep employees and others unharmed from welding and cutting dangers.

2.0 **SCOPE**

This section provides common welding and cutting safety requirements and responsibilities.

3.0 **INDEX TO SECTION**

- 1.0 Purpose
- 2.0 Scope
- 3.0 Index to Section
- 4.0 Company and Employee Responsibilities
- 5.0 Compressed Gas Cylinders
- 6.0 Torches, Hoses and Regulators
- 7.0 Arc Welding Procedures
- 8.0 Hot Work In Confined Spaces
- 9.0 Personal Protective Equipment
- 10.0 Fire Precautions
- 11.0 Training

4.0 **COMPANY AND EMPLOYEE RESPONSIBILITIES**

Basic responsibilities are as follows:

1. This company shall:
 - a. Verify that each employee has received safety training in the use of equipment and instruction in the governing rules for welding and cutting operations, before allowing the employee to use the equipment;
 - b. Provide ventilation and/or respiratory protection to an employee against toxic or hazardous materials or deficient oxygen; generated by welding, cutting or burning of lead base metals, zinc, cadmium, mercury, beryllium or exotic metals or paints not listed here. (See



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Section 21, Hexavalent Chromium Compliance Program and Section 31. PPP,s Respiratory Protection Program for additional requirements)

- c. Assure that employees wear personal protective equipment as required; and
 - d. Assure that a competent person trained in safe welding and Cutting work practices are designated in charge of welding and cutting operations
 - e. Hot Work Permits shall be utilized where required, prior to commencement of hot work. [Precautions that are to be taken shall be in the form of a written permit.](#)
2. Employees shall:
- a. Use welding and cutting equipment as trained and authorized;
 - b. Use required protective equipment;
 - c. Not tamper with safety devices; and
 - d. Discontinue use of and report to the supervisor any faulty or defective equipment;
 - e. Repairs shall be made only by qualified personnel.
 - f. [Workman assigned to operate or maintain equipment must be familiar with section \(1910.254\) and with 1910.252\(a\)\(b\) & \(c\). If gas shielded arc welding is done they must be familiar with the American Welding Society Standard A6-1-1966.](#)
3. Welding operations shall not be permitted in the following situations:
- a. In an area not authorized by the building or structure occupant or owner;
 - b. In a sprinklered building while the sprinkler system is impaired, unless a fire watch is provided;



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- c. In the presence of a potentially explosive atmosphere, such as mixtures of flammable gases, vapors, liquids or dusts with air; and
- d. Where fumes of chlorinated hydrocarbons are present or will reach or be drawn into the atmosphere surrounding the welding operation.

5.0 COMPRESSED GAS CYLINDERS

Much about the storage and handling of cylinders is addressed in Section No. 15 of this program, entitled Fire Protection and Prevention. Other cylinder use procedures not provided in Section No. 13 include:

1. The cylinder valve shall be opened slightly for an instant and then closed to clear the valve of dust and dirt, before connecting a regulator or manifold. Care shall be taken to ensure that nothing is in front of the valve outlet during this operation that would create a hazard. The employee opening the valve shall position himself/herself away from the outlet.
2. Pressure to a regulator shall be introduced by slowly opening the cylinder valve.
3. Acetylene cylinder valves shall only be opened enough to allow proper working pressure and not more than 1 ½ turns of the spindle.
4. Acetylene shall not be utilized or piped at a pressure in excess of 15 psig, except in cylinder manifolds.
5. Cylinders to which a regulator is attached shall not be moved unless secured to a hand or powered truck designed or equipped for this purpose.
6. Cylinder valves shall be closed:
 - a. When moving the cylinder;
 - b. When the work is completed or left unattended for any prolonged period of time (e.g., breaks, lunch, between shifts and overnight); and



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- c. When the cylinder is empty.
7. Cylinders without fixed handwheels shall have keys, handles or nonadjustable wrenches on valve stems while in service.
8. Damaged or leaking cylinders shall be taken outdoors away from sources of ignition, tagged with a warning sign, and the manufacturer or distributor notified.

6.0 TORCHES, HOSES AND REGULATORS

The use of torches, hoses and regulators shall comply with the following requirements:

1. Torches, hoses, hose connections and regulators shall be inspected each shift prior to use for damage and/or defects. Damaged or defective equipment shall not be used.
2. Clogged torch tips shall be cleaned with a device such as a drill or cleaning wire designed for this purpose.
3. Torches shall be lit by a friction lighter and not by a match or hot work.
4. Parallel lengths of hose taped together shall have not more than 4 inches out of each 12 inches covered by tape.
5. All hose and hose connections used for welding operations shall be as prescribed by applicable ANSI standards.
6. Suspected hose leaks shall be checked by use of a grease-free leak detecting solution.
7. Hoses that have been subjected to a flashback or have been repaired or spliced shall be tested at twice the normal pressure, but not less than 300 psig.
8. Boxes used for the storage of gas hose shall be ventilated.
9. Regulators shall be used only for the gas and pressure of which they are intended.



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10. Regulators shall be repaired by authorized and trained personnel or shall be returned to the supplier for calibration or repairs.
11. Regulators shall not be removed until the cylinder valve is closed and the regulator drained.
12. Regulators shall have gauges marked "Use No Oil" when used for oxygen.
13. Flame arrestors shall be installed between regulators and fuel gas and oxygen hoses, and check valves shall be installed between the hoses and the torch.
14. Cylinders equipped with a shutoff valve shall have a regulator attached to the cylinder valve or manifold during use.

7.0 ARC WELDING PROCEDURES

Common arc welding requirements and procedures are as follows:

1. Conduit containing an electrical conductor shall not be used for completing a work-lead circuit.
2. Pipelines in service shall not be used as part of a work-lead circuit, but may be used during construction, extension or repair if current is not carried through threaded joints, bolted flanged joints or caulked joints. Special precautions shall be used to avoid sparking at the connection of the work-lead cable.
3. Chains, wire ropes, cranes, hoists and elevators used for carrying loads shall not be used to carry a welding current.
4. Welding cable shall be protected against damage, entanglement or contact with power supply or high-tension wires.
5. Welding cables and electrode holders shall be an approved type capable of handling the maximum electrical current requirements of the work.
6. Welding machines shall be disconnected when being moved, and shall be turned off when not in use.



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7. Electrodes shall be retracted or removed when not in use. Electrode holders not in use shall be placed so they cannot make electrical contact with conducting objects.
8. Welders shall not let live electrodes or holders touch bare skin or damp clothing. When arc welding is performed in wet conditions or under a condition of high humidity, welders shall be protected against electric shock.
9. Electrode holders shall not be cooled by immersion in water.
10. Before starting an arc welding operation, the welder shall:
 - a. Make sure the work lead is secured to the work in such a manner so as to assure continuous continuity to prevent sparking and overheating of work lead.
 - b. Spread out the welding cable, if necessary, to prevent overheating and damage.
11. Welders shall not curl or loop welding cable around their bodies.
12. Employees working in the vicinity of arc welding operations and exposed to the direct rays of the arc shall be shielded by a noncombustible or flameproof screen.
13. Spliced welding cable shall not be used within 10 feet of an arc welding machine.
14. Cut insulation on welding cable shall be protected by electrical tape and made water tight or the cable shall be replaced.

8.0 HOT WORK IN CONFINED SPACES

Confined space entry procedures are addressed in Section No. 9 of this program. Additional confined space hot work requirements include:

1. Cylinders shall not be located in a confined space or near a confined space where escaped gases could find their way into the space.
2. Welding machines with internal combustion engines shall not be located in or near confined spaces.



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3. When not in use, the torch and hose shall be removed from the confined space. Cylinder valves will be shut off and regulators disconnected.
4. When not in use, the electrode shall be removed from the holder and the welding machine shut off.

9.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment requirements for welding operations include:

1. Face and eye protection shall be worn by welders when performing welding operations and by other employees exposed to a risk of injury from spatter or flash, or both. [The following is a guide for the selection of the proper shade numbers. These recommendations may be varied to suit the individual's needs in accordance with 29 CFR 1910.252\(b\)\(2\)\(ii\)\(H\) of the Occupational Safety and Health Administration.](#)

Welding operation	Shade No.
Shielded metal-arc welding 1/16, 3/32, 1/8, 5/32-inch electrodes	10
Gas-shielded arc welding (nonferrous) 1/16, 3/32, 1/8, 5/32-inch electrodes	11
Gas-shielded arc welding (ferrous) 1/16, 3/32, 1/8, 5/32-inch electrodes	12
Shielded metal-arc welding: 3/16, 7/32, 1/4 inch electrodes	12
Shielded metal-arc welding: 5/16, 3/8-inch electrodes	14
Atomic hydrogen welding	10 – 14
Carbon arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 inch to 6 inches	4 or 5
Heavy cutting, 6 inches and over	5 or 6
Gas welding (light) up to 1/8 inch	4 or 5
Gas welding (medium) 1/8 inch to 1/2 inch	5 or 6



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Gas welding (heavy) 1/2 inch and over

6 or 8

2. Fire-resistant gloves and coveralls/aprons (sleeves down and collar buttoned up) shall be worn during welding, flame cutting and brazing processes.
3. When necessary, such as when performing overhead arc welding, protective sleeves shall be provided and worn to protect the arms.
4. Leather footwear or other appropriate apparel that covers the ankle shall be worn.
5. Other protective devices, such as, but not limited to, body protection, chaps and curtains shall be provided and used when an employee is exposed to a risk of injury by flash burn, sparks and other foreign bodies.

10.0 FIRE PRECAUTIONS

Fire prevention is addressed in Section No. 15 of this program. Other welding operation fire precautions include:

1. Welding operations shall not be performed within 50 feet of explosives, stored cylinders or stored fuel. Combustible and flammable materials located within 35 feet of a welding operation shall either be removed or covered with fire-resistant material.
2. Cracks or openings through which sparks could pass in the floor or wall within 35 feet of a welding operation shall be covered with a fire-resistant material.
3. Wood floors within 10 feet of a welding operation shall be protected by either wetting down, covering with sand or covering with a fire-resistant material.
4. The appropriate fire extinguisher shall be immediately available to the work area during welding operations.



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5. Assigned fire watchers must be trained in the use of fire extinguishing equipment and familiar with the facilities for sounding an alarm in the event of a fire.
6. Conveyor and exhaust systems within 35 feet of a welding operation that might carry sparks or hot slag shall be protected or shut down.
7. PPP supervisors shall designate a person as responsible for fire safety during welding operations where a fire could start or where any of the following conditions exist:
 - a. Appreciable combustible and flammable materials are more than 35 feet from a welding operation, but are easily ignited.
 - b. Combustible and flammable material is adjacent to the opposite side of a metal partition, wall, ceiling or roof that may ignite by conduction or radiation.
 - c. If there is a possibility that a smoldering fire may have started, the fire watch shall remain at the scene of the work for not less than 30 minutes after the welding operation has stopped.

If combustible and flammable materials cannot be taken to a safe place or guards cannot be used to confine heat, sparks, and slag so as to protect the immovable combustible and flammable materials, the welding and cutting shall not be performed.

Before cutting or welding is permitted the area shall be inspected by site superintendent. Precautions that are to be taken shall be in the form of a written permit.

11.0 TRAINING

Power Process Piping's **cutters, welders and their supervisors** are highly skilled building trades craftsmen assigned by local unions to our work. Employees receive extensive classroom and on-the-job apprenticeship training under the direction of a joint union and management apprenticeship committee. Apprentices receive individual instruction and training in the safe and proper use of welding and cutting equipment and tools by experienced journeymen craftsmen within their specific trade.

Additional and continual safety training occurs as outlined in Section No. 38 of this program.



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REVISION HISTORY

Revision number	Description of change	Written by	Checked by	Effective date
1	Revised to meet current standards	George Newton	Safety	1/11/2011
	Program reviewed and Revision History added		GMN	4/16/2014
2	Added details to section 9. PPE	George Newton		6/30/2015
3	Added details to section 4 and 11	Mike McCaffrey		12/5/17