



Section 21: Welding, Cutting, and Burning

1. General Information

Contractors must follow approved, site-specific procedures for welding, cutting, and burning. If no site-specific procedures exist, contractors are to use the procedures described in this section.

2. Permits

- 2.1 Welding, cutting, or spark-producing work is prohibited until the EQ representative or EHS manager has issued the proper permit.
- 2.2 Within areas with sprinkler protection, the sprinkler system shall be operational at all times during the performance of open flame work – unless the EQ EHS manager has issued special permission. Under no circumstance are hot-work permits to be issued for areas in which the sprinkler system is impaired or malfunctions.

3. Handling and Storage of Cylinders

- 3.1 A suitable cylinder truck with chain or other secure form of fastening must be used to keep cylinders from being knocked over while in use or in storage. An acceptable cylinder wrench must be installed on each cylinder truck.
- 3.2 Cylinders must be legibly marked to identify content.
- 3.3 Do not store cylinders of oxygen near cylinders of acetylene or other fuel gas. Separate cylinders by a minimum of 20 feet, or with a 5-foot non-combustible barrier with at least a 2-hour fire rating. Do not place cylinders where they can contact an electrical circuit.
- 3.4 Keep oxygen cylinders, cylinder valves, couplings, regulators, hoses, and apparatus free from oil and grease. Do not handle oxygen cylinders or apparatus with oily hands or gloves.
- 3.5 Keep cylinders in storage away from sources of heat, flame, and direct sunlight. Remove combustibles from the storage area.
- 3.6 Close valves on empty cylinders. Keep valve protection caps in place except when cylinders are in use or connected for use.
- 3.7 Provide a suitable platform when moving cylinders by crane or derrick. Do not use slings, hooks, or electric magnets. Acetylene cylinders should be protected in a cradle while being transported by crane or derrick.
- 3.8 Cylinder caps should remain installed on the cylinder until connected to equipment. Keep the cylinder cap near the cylinder when in use.
- 3.9 Secure compressed gas cylinders in an upright position at all times, except for short periods of time when cylinders are being hoisted or carried. Empty cylinders must be labeled "Empty." If a cylinder is not equipped with a valve wheel, keep a key or cylinder wrench on the valve stem while in use.

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- 3.10 Do not store or take compressed gas cylinders into closed or confined areas, or near elevators or stairs.
- 3.11 Store compressed gas cylinders in well-ventilated, properly constructed storage racks that are labeled for the type of gases to be stored. If a leak develops in a cylinder and it cannot be immediately corrected, move the cylinder to a safe location outside the building.
- 3.12 Visually inspect cylinders to ensure they are safe before use.

4. Welding, Cutting, and Other Hot Work Operations

- 4.1 Each welding, cutting, or spark-producing operation requires a fire watch.
 - A. A fire watch consists of a properly trained person standing by with an approved fire extinguisher provided by the contractor.
 - B. The fire extinguisher must be of a size and type (10 lb. ABC or BC) that will extinguish a fire that may ignite on materials being welded or cut or on materials immediately adjacent to welding and cutting operations.
 - C. The fire-watch person must remain in the area for a minimum of 30 minutes after the hot work is completed to ensure the site is safe.
- 4.2 Frequently inspect hoses, lines, and leads for leaks, worn areas, and loose connections.
- 4.3 Remove combustible materials from the area prior to beginning work.
- 4.4 Provide flash arresters fitted to the regulators at both the fuel and oxygen cylinders. Additional flashback arresters may be fitted to the torch for oxygen and acetylene hoses.
- 4.5 Welding return current must not pass through any of the following:
 - A. Acetylene, fuel gas, oxygen, or compressed gas cylinders.
 - B. Tanks or containers used for gasoline, oil, or flammable/combustible material.
 - C. Pipes carrying compressed air, steam, gases, or flammable/combustible liquids.
 - D. Conduits carrying electrical conductors.
 - E. Chains, wire ropes, metal hand railings, ladders, machines, shafts, bearings, or weighing scales.
 - F. Critical instrumentation.
- 4.6 Shield arc welding and cutting operations by using non-combustible or flame-proof screens.
- 4.7 Provide a mechanically strong and electrically adequate ground for the service required.
- 4.8 If possible, support and elevate welding cables to allow the safe passage of workers and equipment.
- 4.9 Keep welding cables away from ladders and stairways. Prevent doors from closing on, or otherwise damaging welding cables.
- 4.10 Use insulated cable connectors to couple or uncouple several lengths of cable for a welding circuit. Use insulated cable connectors on the ground line and the electrode holder line.

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- 4.11 Use an electrode holder of adequately rated current capacity, insulated to protect the operator against possible shock, and to prevent a short or flash when laid on grounded material.
- 4.12 Do not use cables with worn or damaged insulation.
- 4.13 Insulate connection lugs on welding machines.
- 4.14 Wear suitable eye protection and other personal protective equipment.
- 4.15 Ensure adequate ventilation.
- 4.16 When welding overhead, take precautions to prevent sparks from falling on other workers.
- 4.17 Do not use regulators, leads, torches, or other associated equipment that is damaged or defective.