

Gas Welding and Cutting: Safe Operating Procedures When Hot Work is Being Performed

Safe Practices

What are safe practices that apply to operating gas welding equipment (oxygen and fuel gasses)?

The following is a list of suggested safe operating procedures for gas welding:

- Do not store oxygen cylinders near highly combustible material (especially oil and grease); near reserve stocks of carbide, acetylene or other fuel gas cylinders; near any other substance likely to cause or accelerate a fire.
- Oxygen cylinders in storage should be separated from fuel-gas cylinders or combustible materials (especially oil or grease), at a minimum of 20 feet or by a noncombustible barrier at least five (5) feet high having a fire-resistance rating of at least one-half hour.
- If cylinders are stored inside buildings, they should be stored in a well-protected, well-ventilated, dry location at least 20 feet from highly combustible materials such as oil or excelsior.
- All cylinders should be stored in assigned places away from elevators, stairs or gangways.
- Assigned storage spaces should be located where cylinders will not be knocked over or damaged by passing or falling objects, or subject to tampering with by unauthorized persons.
- All cylinders should not be kept in unventilated enclosures such as lockers or cupboards.
- Empty cylinders should have their valves closed.
- Valve protection caps should always be in place, hand tight, except where cylinders are in use or connected for use.
- Compressed gas cylinders should be marked with either the chemical or the trade name of the gas inside the cylinder.
- All compressed gas cylinders should be stored away from sources of heat.
- Acetylene cylinders should be stored valve end up. Any acetylene cylinder that happens to become horizontal should never be used, tagged "Out of Service", and removed by a cylinder company.
- If oxygen cylinders are stored outside of generator houses, then the generator and the cylinders should be separated by a gastight, noncombustible partition having a fire-resistance rating of at least one hour.
- Cylinders, cylinder valves, couplings, regulators, hoses and apparatus should be kept free from oily or greasy substances.
- Cylinders should be secured in a manner that prevents them from being dropped, struck or permitted to strike each other violently at all times. Materials used to secure the cylinders should not be combustible, and should be capable of supporting the weight and force needed to appropriately support the cylinders.
- Valve-protection caps should not be used for lifting cylinders from one vertical position to another.
- Cylinders should not have fixed handwheels, keys, handles or nonadjustable wrenches on the valve stems while the cylinders are in service.
- Cylinder valves should be closed before moving a cylinder and when work is finished. If hot work is being conducted in an enclosed space, cylinder valves should be closed whenever the torch is not in use or left unattended for an extended period.
- Cylinders should be kept away from sparks, hot slag or flame produced by hot work procedures, or fire-resistant shields should be provided and used to protect the cylinders.
- Cylinders should not be positioned where they can become part of an electric circuit.
- Cylinders should not be used as rollers or supports.
- Only the proper tools are allowed to be used to open cylinder valves.
- All fuel-gas cylinders should be placed valve end up, especially when being transported by powered vehicles.
- Cylinders with leaky valves or fittings should be taken outdoors away from ignition sources and other individuals and slowly emptied. The cylinder should be dealt with in the manner outlined by the Out of Service procedures section of this guide.

Follow these suggestions to help keep you safe during Hot Work.



- Repair of regulators should be performed by properly instructed skilled mechanics.
- Cylinders containing oxygen, acetylene or other fuel gas should not be taken into confined spaces.
- Manifolds should be placed in safe, well-ventilated and accessible locations and not within enclosed spaces.
- Oxygen and fuel gas hoses should not be interchangeable and should be distinguishable by color or by surface characteristics. A single hose having more than one gas passage shall not be used.
- Hose couplings should be of the type that cannot be unlocked or disconnected without a rotary motion.
- Boxes used to store fuel gas hose should be ventilated.
- All oxygen and fuel gas regulators and their gauges should be in proper working order.

What are the safe practices that apply to operating arc welding equipment?

The following is a list of safe operating procedures for arc welding:

- Workers and other persons near an arc welding operation should be protected by noncombustible or flame-proof screens or shields where the work allows. These screens should not impede ventilation by significantly restricting airflow through the work area. If the work does not allow these screens or shields then goggles should be suggested.
- Cables with damaged insulation or exposed bare conductors should be replaced, tagged "Out of Service" and not used.
- Joining lengths of work and electrode cables shall be done by the use of connecting means specifically intended for the purpose. The connecting means should have adequate insulation for the service conditions.
- Open-circuit (No Load) voltages of arc welding and cutting machines should be as low as possible, consistent with satisfactory welding.
- When open-circuit voltages are suggested to be higher, a mean(s) should be provided to prevent the operator from making accidental contact with the higher voltages.
- Control apparatus should be enclosed on all types of arc welding machines.
- Terminals for welding leads should be protected from accidental contact by personnel or metal objects.
- Connections for portable control devices, such as push buttons carried by the operator, are connected to an AC circuit of higher than 120 volts.
- The frame or case of a welding machine should be effectively grounded, and the grounding should be checked.
- Electrode holders should be placed so that they cannot make electrical contact with persons, conducting objects, fuel or compressed gas tanks.
- Cables should be free from repair or splices for a minimum of 10 feet from the cable end to which the electrode holder is connected.
- Hot electrode holders should not be dipped in water because this may expose the operator to electrical shock.
- When the operator leaves his/her work or stops work for any appreciable length of time, or when the machine is to be moved, the power supply switch to the equipment should be opened.
- Coiled welding cable should be spread out to avoid serious over-heating and damage to insulation.
- The work lead should be firmly attached to the work; magnetic work clamps should be freed of adherent metal particles of spatter on contact surfaces.
- Machines that become wet should be thoroughly dried and tested before they are used again.
- Conduits containing electrical conductors should not be used for completing a work-lead circuit.
- Pipelines should not be used as a permanent part of a work-lead circuit, but may be used during construction, extension or repair provided current is not carried through threaded joints, flanged bolted joints, or caulked joints and that special precautions are used to avoid sparking at the work-lead cable.
- Chains, wire ropes, cranes, hoists and elevators should not be used to carry welding current.
- Where a structure, conveyor or fixture is regularly employed as a welding current circuit, joints should be bonded or provided with adequate current collecting devices.

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