Arc welding and cutting safety

Welders shall follow safe working conditions and safety training

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INTRODUCTION

As in most trades, welders are exposed to certain hazards. Hazards exist with all arc welding and allied processes.

Welding is safe when safe practices are followed.

This booklet is a brief outline of precautionary measures that will help avoid the hazards of arc welding and allied processes.

Read and understand the manufacturer's instructions and your employer's safe practices.

Your Safety Director or Supervisor should be consulted when specific questions arise.

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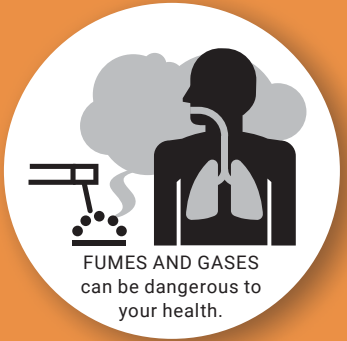
For further information, refer to American National Standard Institute (ANSI) Z49.1, Safety in Welding, Cutting, and Allied Processes, and AWS F4.1, Safe Practices for the Perparation of Containers and Piping for Welding, Cutting, and Allied Processes, available from the American Welding Society, 8669 NW 36th Street, Miami, FL 33166.

Requirements of the OSHAct are given in Title 29, Code of Federal Regulations, Section 1910 Subpart Q, available from the U.S. Government Printing Office, 732 North Capitol St NW, Washington, DC 20401, and the booklet, "TLVs, Threshold Limit Values.," American Conference of Governmental Industrial Hygienists, 3640 Park 42 Dr., Cincinnati, OH 45241.

WARNING

PROTECT YOURSELF AND OTHERS.
READ AND UNDERSTAND THIS BOOKLET.



FUMES AND GASES
can be dangerous to
your health.

ARC RAYS
can injure eyes and
burn skin.

ELECTRIC SHOCK
can
kill.

CYLINDER may explode if damaged

- Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas/shielding gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.
- Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- Cylinders should be located:
  - Away from areas where they may be struck or subjected to physical damage.
  - A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a cylinder.
- Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-I, “Standard for Safe Handling of Compressed gases in Containers,” available from the Compressed Gas Association, 8484 Westpark Drive, Suite 220, McLean, Virginia 22102, United States.

WELDING SPARKS can cause fire or explosion

- Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.
- Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding, Cutting, and Allied Process (ANSI Standard Z49.1)" and the operating information for the equipment being used.
- When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to ensure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned". For information, purchase "AWS F4.1, Safe Practices for the Preparation of Containers and Piping for Welding, Cutting, and Allied Processes" from the American Welding Society, 8669 NW 36th Street, Miami, FL 33166.
- Vent hollow castings or containers before heating, cutting or welding. They may explode.
- Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
- Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.

FUMES AND GASES can be hazardous to your health

KEEP your head out of the fumes. Not all fumes can be seen so use proper respiratory protection.

DON'T get too close to the arc. Use corrective lenses or magnifiers if necessary to stay a reasonable distance away from the arc.

READ and obey the precautionary labels that appear on all containers of welding materials.

USE ENOUGH VENTILATION or exhaust at the arc, or both, to keep fumes and gases from your breathing zone and the general area.

IN A LARGE ROOM OR OUTDOORS, natural ventilation may be adequate if you keep your head out of the fumes (See ANSI Z49.1, from the American Welding Society, 8669 NW 36th Street, Miami, FL 33166 or CSA Standard W117.2.

USE NATURAL DRAFTS or fans to keep the fumes away from your face. Position yourself so that the drafts blow across your face and not from back to front, or front to back.

BE SURE adequate ventilation is available.

DO NOT USE OXYGEN for ventilation. Avoid oxygen enriched atmospheres. In confined areas, ventilation must be adequate to keep airborne contaminants below allowable limits and to prevent insufficient or excess oxygen in the atmosphere. Special equipment may be necessary to provide proper ventilation.

If you develop unusual symptoms, see your supervisor. Perhaps the welding atmosphere and ventilation system should be checked. If symptoms persist, see a physician.

DO NOT TOUCH LIVE ELECTRICAL PARTS

ELECTRIC SHOCK CAN KILL

BE SURE you are insulated from live electrical parts.
BE SURE equipment is adequate for the job.
BE SURE equipment is installed according to prevailing codes.
BE SURE damaged parts are repaired or replaced.
BE SURE welding machine is properly grounded.
BE SURE glove have no holes.
BE SURE to stay dry; do not weld when you are wet.
BE SURE equipment is turned OFF when not in use.
DO NOT use cables that are too small, damaged, or poorly spliced.
DO NOT wrap cables around your body.

ELECTRIC AND MAGNETIC FIELDS may be dangerous

- Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines.
- EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.
- Exposure to EMF fields in welding may have other health effects which are now not known.
- All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:
  - Route the electrode and work cables together - Secure them with tape when possible.
  - Never coil the electrode lead around your body.
  - Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.
  - Connect the work cable to the workpiece as close as possible to the area being welded.
  - Do not work next to welding power source.

WEAR correct eye, ear, and body protection

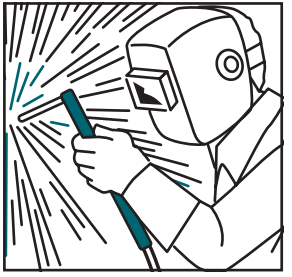
PROTECT your eyes and face with a properly-fitted welding helmet and with proper grade of filter plate (See ANSI Z49.1).

PROTECT your body from welding spatter, arc flash, and fire hazard with flame resistant protective clothing including apron and gloves, leather leggings, and high boots. Do not wear clothing made from flammable synthetic fabrics.

PROTECT others from spatter, flash, and glare with protective screens or barriers.

IN SOME AREAS, protection from noise is appropriate. Wear hearing protection when required.

BE SURE protective equipment is in good condition. Wear safety glasses in work area AT ALL TIMES.



ADDITIONAL precautionary measures

PROTECT compressed gas cylinders from excessive heat, mechanical shocks, and arcs; fasten cylinders so they cannot fall.

BE SURE cylinders can never become part of an electrical circuit.

REMOVE all potential fire hazards from welding and gas storage areas.

BE SURE to follow the manufacturer's operating procedures.

BE SURE to read and understand all labels.

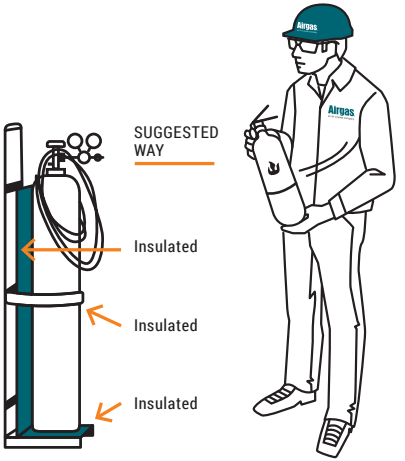
DO NOT use cylinder odor, color, or shape to identify its contents.

DO NOT strike an arc on cylinders.

BE SURE to use proper respiratory protection.

BE SURE to use proper fume/smoke extraction equipment.

ALWAYS HAVE FIRE FIGHTING EQUIPMENT READY FOR IMMEDIATE USE AND KNOW HOW TO USE IT



SPECIAL situations

DO NOT WELD OR CUT containers unless they are properly cleaned. This is extremely hazardous.

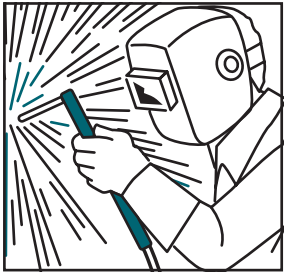
DO NOT WELD OR CUT painted, plated, or coated parts unless special precautions with ventilation have been taken. They can release highly toxic fumes or gases. Painted parts can release toxic hydrocarbons, chromates, or lead compounds. Plated and coated parts can release toxic cadmium or zinc fumes.

CONFINED SPACE operations require special attention to ventilation as well as entry and exit procedures.

DO NOT EXCEED GAS REGULATOR PRESSURES recommended by the equipment supplier.

STORE CYLINDERS in accordance with National Fire Protection Association standards and local fire codes.

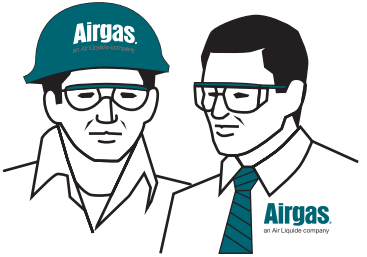
Refer to the references listed inside the front cover for directions on how to deal with such special situations.



COOPERATING for safety

Cooperation between management and employees is vital to the success of every company. By working together toward the common goal—**SAFETY IN WELDING**—everyone wins!

Welders and their supervisors should have adequate safety training.



ARC WELDING can be hazardous

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of “Safety in Welding, Cutting, and Allied Process (ANSI Standard Z49.1)” from the American Welding Society, 8669 NW 36th Street, Miami, FL 33166 or CSA Standard W117.2.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

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