

ELECTRICAL HAZARDS

INTRODUCTION



ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. Additionally, serious injury can occur if the welder falls as a result of the shock.

The electrode and work circuit is electrically live whenever the output is on. All of the following are electrically energized when the power is “on”: the welding circuit (including the electrode and workpiece), input power and machine internal circuits, the wire, reel of wire, drive rolls, and all other metal parts touching the energized electrode. Incorrectly installed or improperly connected protective conductor or grounded equipment is a hazard.

HOW TO AVOID ELECTRIC SHOCKS

Use proper precautionary measures and recommended safe practices at all times. Train all personnel using welding and cutting equipment to reduce the risk of injuries, fatalities, and electrical accidents, by following these instructions:

- Read all instructions, labels, and installation manuals before installing, operating, or servicing the equipment.
- Properly install, ground and operate the equipment in accordance with the instruction manual and national, state, and local codes.
- Only qualified persons should install, operate, maintain, and repair this equipment. A qualified person is defined as one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated ability to solve or resolve problems relating to the subject matter, the work, or the project and has received safety training to recognize and avoid the hazards involved.
- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be present.
- Do not allow the electrode holder or electrode to come in contact with any other person or any grounded object.
- Do not connect more than one electrode or work cable to any single weld output terminal. Disconnect cable for process not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables, welding gun cables, or torch cables.
- Do not use AC weld output in damp, wet, or confined spaces, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these

conditions, use the following equipment in order presented: 1) a semiautomatic DC constant voltage (wire) welder, 2) a DC manual (stick) welder, or 3) a DC or AC welder with reduced open-circuit voltage (VRD), if available.

- Do not work alone.
- Make sure all connections are tight, clean, and dry.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Do not wrap cables carrying electric current around any part of your body.
- Frequently inspect input power cord and ground conductor for damage or bare wiring – replace immediately if damaged – bare wiring can kill.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Turn off all equipment when not in use. Disconnect the power to equipment that will be left unattended or out of service.
- Disconnect the input power or stop the engine before installing or servicing the equipment.
- Use only well-maintained equipment. Frequently inspect welding equipment and repair or replace all damaged parts before further use. Maintain equipment according to manufacturer's instructions.
- Keep all covers and panels securely in place.

PROCEDURES FOR ELECTRIC SHOCK

- Turn off the electric power.
- Use non-conducting material, such as dry wood, to free the victim from contact with live parts or wires.
- If the victim is not breathing, call for emergency services. Administer cardiopulmonary resuscitation (CPR) immediately after breaking contact with the electrical source. Continue CPR until breathing starts or until help arrives.
- Where an automatic electronic defibrillator (AED) is available, use according to instructions.
- Treat an electrical burn as a thermal burn by applying sterile, cold (iced) compresses. Prevent contamination, and cover with a clean, dry dressing.

INFORMATION SOURCES:

American National Standards Institute (ANSI). *Safety in Welding, Cutting, and Allied Processes* (ANSI Z49.1)
www.aws.org

Occupational Safety and Health Administration (OSHA). *Code of Federal Regulations*, Title 29 Labor, Parts 1910.1 to 1910.1450
www.osha.gov

National Fire Protection Association (NFPA). *National Electric Code* (NFPA 70)
www.nfpa.org

National Fire Protection Association (NFPA). *Standard for Fire Prevention During Welding, Cutting and Other Hot Work* (NFPA 51B)
www.nfpa.org

Mine Safety and Health Administration (MSHA). *Code of Federal Regulations* Title 30 Mineral Resources, Parts 1 to 199,
www.msha.gov

American Welding Society (AWS). *Safety and Health Fact Sheets*
www.aws.org

AS 1674.2 Safety in welding and allied processes Part 2: Electrical
<https://www.standards.org.au/>

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