

SAFETY IN WELDING

Safety is a critical consideration for any welding project. Arc welding is a safe occupation when proper precautions are taken. But, if safety measures are ignored, welders face an array of hazards which can be potentially dangerous, including electric shock, fumes and gases, fire and explosions and more.

Welders are members of an occupational group which is exposed to a number of different environmental problems

- Electricity
- Electromagnetic fields
- UV, IR and visible light radiation
- Air pollution
- Fire and Spatter
- Noise
- Ergonomics

To help keep welders safe, organizations such as the American Conference of Governmental Industrial Hygienists (ACGIH) and the Occupational Safety and Health Administration (OSHA) offer safety guidelines to help control, minimize or to help employers and workers avoid welding hazards. Employers should ensure all workers have an opportunity to comply with the following important guidelines in the workplace:

- Read and understand manufacturer instructions for equipment
- Carefully review material safety data sheets
- Follow the company's internal safety practices
- Awareness of the most common welding hazards and knowing how to avoid them ensures a safe, productive work environment for all.



It's important to remember to never touch the electrode or metal parts of the electrode holder with skin or welding clothing and insulate yourself from the work and ground.

Electric shock

Electric shock is one of the most serious and immediate risks facing a welder. Electric shock can lead to severe injury or death, either from the shock itself or from a fall caused by the reaction to a shock.

Electric shock occurs when welders touch two metal objects that have a voltage between them, thereby inserting themselves into the electrical circuit. For instance, if a worker holds a bare wire in one hand and a second bare wire with another, electric current will pass through that wire and through the welding operator, causing an electric shock. The higher the voltage, the higher the current and, thus the higher the risk for the electric shock to result in injury or death.

The most common type of electric shock is secondary voltage shock from an arc welding circuit, which ranges from 20 to 100 volts. Bear in mind that even a shock of 50 volts or less can be enough to injure or kill an operator, depending on the conditions. Due to its constant change in polarity, alternating current (AC) voltage is more likely to stop the heart than direct current (DC) welders. It is also more likely to make the person holding the wire unable to let go.

To avoid secondary voltage shock, welding operators should wear dry gloves in good condition, never touch the electrode or metal parts of the electrode holder with skin or wet clothing and be sure to insulate themselves from the work and ground, keeping dry insulation between their body and the metal being welded or ground (such as a metal floor or wet surface).

ADOR Welding Limited (AWL) offers a wide range of PPE (Personal Protective Equipment), like Welding Gloves, Safety Shoes and other safety products to ensure the welders' safety. In addition, AWL offers VRD (Voltage Reducing Device) as a built-in feature as an option, and also VRD Units which can be fitted externally to any AC or DC SMAW Welding machine, which keeps the secondary voltage down to a safe level of 18-20 V when no welding is being done (machine switched on, but in idle condition). Full welding power is automatically enabled whenever the welder strikes the welding arc. An even more serious shock, primary voltage shock, may occur when a welder touches electrically "hot" or "live" parts inside the welder case or the electric distribution system to which the welder is connected. This action can lead to a shock of 230 or 415 volts. AWL offers ELCB as an option in their welding machines to completely eliminate this hazard.

Fumes and gases

Overexposure to welding fumes and gases can be hazardous to the health of the welder as well as any other person who is working in the vicinity of the welding area. Welding fume contains potentially harmful complex metal oxide compounds from consumables, base metal and the basemetal coatings, so it is important to keep the head out of the fumes and use enough ventilation and/or exhaust to control the exposure to substances in the fume, depending on the type of rod and base metal being used.

The specific potential health effects which relate to the welding consumable product being used can be found in the Health Hazard Data section of the Safety Data Sheet available from the consumable manufacturer.

Welding areas require adequate ventilation and local exhaust to keep fumes and gases from the breathing zone and the general area. In most situations, a ventilation system- such as a fan, and an exhaust system or fixed or removable exhaust hoods- to remove fumes and gases from the work area are provided.

AWL has introduced in their range different models of Welding Fume extraction systems, both stand-alone as well as centralized systems (KING EXTRACTORS), with advanced technology, special filters and with or without built-in compressors



Welding areas require adequate ventilation and local exhaust to keep fumes and gases from the breathing zone and the general area.

Fire and explosions

Welding arc creates extreme temperatures, and may pose a significant fire and explosions hazard if safe practices are not followed. While the welding arc may reach temperatures of 10,000 degrees Fahrenheit, the real danger is not from the arc itself, but rather the intense heat near the arc and the sparks and spatter created by the arc. This spatter can reach up to 35 feet away from the welding space.

To prevent fires, before beginning to weld, inspect the work area for any flammable materials and remove them from the area. Flammable materials are comprised of three categories: liquid, such as gasoline, oil and paint; solid, such as wood, cardboard and paper; gas, including acetylene, propane and hydrogen.



It is important to protect fire-sensitive things where there is a risk of fire during welding. Fire extinguishers with foam - spray system and buckets filled with sand must be placed adjacent to all welding zones



Rotators are used to rotate a job with circular or cylindrical profile to help the welder consistently without changing his position and welding torch angle continuously



Special attachments and extensions to interconnection cables reduce welder fatigue for welding at long distances from the Power Source

Ergonomics

When welding heavy material manually and during assembly, welding the loads are very static. Positioning welding also gives high loads. Ergonomic control of Welder's position, arrangement of rotating tables (rotators and turn tables) is important to reduce welder fatigue and chances of poor weld quality.

Other safety considerations

Welders should also be aware of other safety considerations within the work environment. For example, those working in a confined space or in an elevated area make need to take extra precautions. In an elevated situation, welding operators should pay close attention safety information on the products being used and the material safety data sheets provided by the manufacturer and work with their employer and co-workers to follow appropriate safe practices for their workplace.

Good common sense is also key. If opening cans of electrode, keep hands away from sharp edges. Remove clutter and debris from the welding area to prevent tripping or falling. And never use broken or damaged equipment or PPE. To keep up with the most recent safety practices, welding operators should utilize resources from the American Welding Society (AWS), OSHA and welding manufacturers.

By following these safe practices and using common sense, operators can stay safe and keep production moving with no lost-time accidents. Safety & Health Fact Sheets are provided in the ANSI Z49.1 Standards.

Follow Us:



For more information on the above please get in touch with cmo@adorians.com

