7 Welding Hazards to Avoid

RAMP RISK ASSESSMENT MANAGEMENT & PREVENTION

Welding Hazards can be roughly broken into seven risks categories:

1. *Electrical hazards*

Arc welding is based on the creation of an electrical circuit, and a "break" in the electrical circuit, where the electricity is forced to travel through a gas (that becomes ionized in this process). The resistance in gas (think about the difficulty electricity has traveling through air) creates an "arc." An arc is comprised of electrical energy lost as heat and light, so electrical hazards may be the most intuitively recognizable risk in arc welding.

Common electrical hazards include:

- Improperly wired machines: If a machine is not properly wired, the metal outer shell of the welder may be electrically hot, which represents a serious risk for electrical shock. Always use a licensed electrician to wire machines.
- Improper personal protective equipment (PPE): Damp or wet clothing, or welding in a wet area, increases the risk of completing the circuit. Clean, dry gloves and rubber-soled boots provide insulation.
- High frequency can change the risks: Some welders, specifically gas tungsten arc welders (GTAW), use a high frequency voltage superimposed upon the welding current to initiate an arc without making electrical contact between the electrode and the work piece. The welder should not put himself or herself in the electrical circuit, even if not actually making direct contact with the electrically hot tungsten, and especially if not wearing gloves. People with implanted medical devices and pace makers should stay away from welding equipment that utilizes high frequency radiation.

Beyond following the procedures, safety in welding is largely based on understanding hazards and awareness of your surroundings.

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- Removing the cover of the welder increases risks: Some welders can store electrical energy even when the input voltage is removed. Never open up a welder to expose electrical components for repair unless properly trained.
- Awareness of the electrical circuit can mitigate risk: Being aware of what is electrically hot is critical to maintaining your own safety. Cylinders and structural building components such as I-beams should never be made part of the electrical circuit. All electrical connections, including ground clamps and cables, should be tight, and not worn or frayed.

"Safety is not an intellectual exercise to keep us in work. It is the sum of our contributions to safety management that determines whether the people we work with live or die."

-Sir Brian Appleton

2. Heat-related risks

Work pieces can be hot, and this may not always be visually apparent. To reduce the risk of burns, allow pieces that have been welded or cut adequate time to cool. Also, sparks from the welding process are hot metal and can burn arms or exposed skin, as well as eyes. Proper PPE, including closed-toe shoes, safety glasses with side shields under a welding. Light helmet, welding jackets and covering exposed skin, can help the welder avoid burns.

3. Related risks

Arc welding, plasma welding and cutting, and oxy-fuel welding and cutting all produce light. Eyes are best protected from UV and visible light emission of arc welding by means of a welding helmet. Different shades of lenses are available as appropriate for different welding processes and currents. Welding shades generally vary between 8 and 12, although auto-darkening helmets can have variations between 7 and 14. If you are not sure what lens shade you need, see your welding distributor. Newer auto-darkening helmets utilize lenses that protect from UV (ultraviolet) and IR (infrared) light even when not darkened. Other employees working near a welder should also be protected with welding screens. Oxy-fuel welding should use at least Shade 5 goggles. Another risk related to the light from arc welding is burns to the skin akin to rapid sunburn. Use proper PPE to make sure no skin is exposed.

4. Fire –related risks

Maintaining a workspace free of flammability hazards such as oil rags is one of the best ways to reduce risk of fire. Butane lighters should not be kept in the welder's pocket or on the welder's person, and oxygen should never be use to clean the welder's clothes or introduced into the welding area. Even vapors from gasoline or other chemicals can create flammability risk and should be kept away from the area. Remember, sparks can fly from the welding area into the surrounding area and present a risk for anything flammable in the nearby vicinity. Welding or cutting a tank that once contained something flammable or an unknown chemical is not advised.

5. Asphyxiation risks

Asphyxiation robs your body of sufficient oxygen to live. If other gases displace oxygen out of the area or decrease the percentage of oxygen in the air, a welder would still have "air" to breathe, but if this air is depleted of oxygen, asphyxiation can take place quickly and without warning. Never weld in a confined space without supplied breathing air. Be aware that cylinders left open or liquid cylinders releasing pressure through a relief valve can introduce gas into the area that can displace oxygen and case asphyxiation. Allow for lateral airflow into the welding area through open doors and use of fans.

6. Fumes/respiratory risks

Some materials — for example, coated materials and stainless steels — can create toxic fumes. Know the base metal you are welding and associated hazards. Remove oils and other foreign chemicals that can be vaporized when welding, prior to heating the piece. Different filler metals and electrodes can have their own unique hazards. Some tungsten can contain thorium, which is a radioactive element. This can present a hazard in the grinding area where dust can be inhaled.

7. Gas use and storage

The risks associated with compressed and liquefied gases vary and can include, but are not limited to, flammability, risk of explosion and risk of accelerating combustion and temperature.