Welding, soldering, and brazing are commonly known as “hot work”. Hot work presents increased potential for fire and explosion hazards, especially when performed in confined and enclosed spaces. You must be aware of these hazards to work safely and avoid accidents and injuries.

All welding, brazing, and soldering operators must be trained on each piece of equipment they use. You must be trained by your supervisor or another qualified person before conducting any type of hot work. All training must be documented and kept on file.

COMMON HAZARDS

Air Contaminants

Hot work produces air contaminants. The most common contaminants include metal fumes and gases. Hazardous fumes may be produced from heating toxic metals found in common alloys. Some examples are beryllium, cadmium and nickel. The fume particles created are small and can deposit deep in the lungs.

The adverse health effects of overexposure to welding fumes and gases can range from systemic poisoning to respiratory tract irritations. These effects can be short or long term, depending on the level of exposure. Setting up an appropriate work environment and using the appropriate goggles, face shields, and/or respirators will protect you from contaminants.

Radiation

Both visible ultraviolet (UV) and infrared (IR) radiation are produced when welding and cutting. These types of radiation can cause skin damage (sunburn and cancer) and eye damage (welder’s flash, cataracts, and burns). You may not be aware of these injuries until after they occur since UV and IR radiation is not detectable by the senses. Appropriate clothing and filter lenses will protect you from radiation damage.

Burns and Fires

Hot work can be a fire hazard. Burns, fires, or explosions can result from flames, arcs, molten metals, heated surfaces, or metal splatters. Sparks from welding operations have been known to travel as far as 35 feet horizontally from the welding sight. Be aware of fire hazards when welding and remember that you can cause fires or be burned when working. Unplug and place soldering irons or guns in holders or stands when not in use. Always assume that a soldering iron or gun is hot. Give equipment time to cool down before touching tongs and tips. A fire watch should be posted for at least 30 minutes after the welding operations have ceased to ensure that no fires will be started.
Electrical Shocks

Every year welders die from electric shock. Electric shocks can occur when proper precautions are not taken. Equipment must meet Underwriters Laboratories (UL) code and be checked and serviced regularly. Servicing and installation must only be undertaken by a qualified licensed electrician.

Never tamper with electrical supply circuits or systems. Welders are only responsible for making connections in the welding circuit and for setting external welding machine controls.

Be aware of your work environment. Do not work in wet conditions or on non-insulated surfaces. Use wooden platforms and rubber mats for protection, especially in confined spaces.

Always use fully insulated electrode holders and never touch an energized electrode when in contact with the work circuit. Remember, hot work increases the risk of electrocution due to the reduced skin resistance when sweating occurs. If you sweat profusely, stop working. Don’t touch electrodes or welding wire with your bare hands. And never place holders or welding guns under your armpits.

For your protection, make sure all work areas are well ventilated. Use hoods or local exhaust ventilation (LEV) to minimize exposure to hazardous fumes, gases, and heat.

Consider the safety of other workers around you. Use light filters and welding screens. And always have fire extinguishers readily available.

Do not work around sources of ignition. Keep flammable chemicals in approved storage cabinets. Keep combustible material at least 35 feet (11 meters) away from hot work operations. If this is not possible, then make sure these items are properly shielded. Remember that walls, ceilings, and floors are also combustible. Shield these areas as necessary. Seal or guard any cracks and holes where hot sparks might fall.

Always use appropriate guards when welding. Do not put fingers between tongs or linkages when spot welding. Make sure that guards are always in place, and follow Lock out/Tag out procedures when welding energized or powered equipment.

Gas welding and cutting tasks pose a high level of fire and explosion hazards due to the flammability of the gas cylinders. Always use appropriate pressure and backflow prevention devices when using gas systems. Ignite torches with approved friction devices. Remember to close gas valves before removing regulators.

Protect cylinders from hot metal and sparks by positioning them away from your point of operation. Always secure cylinders from falling over using cylinder racks or other means to secure the cylinder such as having the cylinders chained to the wall.
**Personal Protective Equipment (PPE) Requirements:**

Welding, soldering, or brazing without the proper personal protective (PPE) equipment is dangerous and unhealthy. Because hot work involves an open electric arc or flame, the risk of burns is significant. To prevent burns, you must wear the proper PPE, such as heavy leather gloves and protective long sleeve jackets. Additionally, the brightness of the weld area can lead to a condition called arc eye, in which ultraviolet light causes inflammation of the cornea and can burn the retinas of the eyes. Goggles and welding helmets with dark face plates prevent this exposure. To protect bystanders, translucent welding screens can be placed around the welding area. These curtains, made of a polyvinyl chloride plastic film, shield nearby workers from exposure to the UV light from the electric arc, but should not be used to replace the filter glass used in helmets.