HOT WORK: OTHER HAZARDS

Hot work operations, including welding, pose several physical hazards. Most welding at the University involves either a gas flame or an electrically generated arc. In addition to the general hazards listed below, each operation must be evaluated for specific hazards it may pose.

**ELECTRICAL HAZARDS**

**Is there an electric shock hazard?**
- Electric shock is a serious risk facing a welder.
- In arc welding operations, the primary voltage inside the welding equipment can be as high as 600 volts and the secondary (or welding) voltage is often 20-100 volts.
- A welder can be shocked by touching two different objects that have voltage between them.
- Depending on the conditions, a shock could injure or kill.

**How can I prevent electric shock?**
- Turning the power switch off may not turn the power off to the welder.
- The welder must be unplugged or the circuit de-energized to fully cut power.
- A welder must be installed by qualified personnel to ensure it is compatible with intended uses and the input is the correct phase.

**FIRE HAZARDS**

**What are the fire hazards?**
- The intense heat at the arc and flame from the torch present clear fire hazards.
- Another major fire hazard comes from the sparks and slag (molten metal) produced during the process.
- Sparks can spray up to 35 feet from the welding area and can cause a fire if they contact a flammable or combustible material.

**How to reduce my risk of fire hazards?**
- The area must be inspected before you start welding operations to identify potential fire hazards and take necessary actions.
- Inspect for any combustible or flammable materials in the area, as well as any other potential sources of ignition. Remove or relocate these materials as needed before starting the welding process.
- Report any identified hazards to the supervisor and follow their guidance on mitigation steps.
- A fire watch is generally required for all welding operations not in a dedicated welding booth.
- Fire watch must observe the process, watching where sparks and slag land, and look for signs of smoke or fire.
- Additional fire watch personnel may be required if the welding is in a location where these sparks or slag may penetrate a wall or floor, or on a raised platform.
- Fire watch should continue at least 30 minutes after welding is complete because a spark may encounter a combustible object and smolder.
These general fire safety rules should be followed during welding operations:

- Welders should be aware of the location of their nearest exits and fire alarm pull stations (if provided) and have a fully charged fire extinguisher ready.
- Those expected to use a fire extinguisher must be trained. Basic Fire Extinguisher training is available online, but hands-on training is required for those performing hot work or acting as fire watch for hot work operations. Both can be accessed on the EH&S website.
- Post the required signage: “Caution: Hot Work Area” to warn anyone entering the space.

COMPRESSED GAS HAZARDS

- Gas welding uses a fuel gas cylinder, often acetylene, as a torch to form a flame.
- In oxy-fuel welding, pure oxygen is used instead of air to increase the temperature of the flame, which differentiates welding from soldering or brazing.
- Gas cylinders pose several hazards and must be properly managed.
- Some types of welding, such as metal inert welding (MIG) and tungsten inert welding (TIG), use shielding gases to protect the weld area from oxygen or moisture.
- Shielding gases are often inert gases such as argon, helium, and carbon dioxide, which can reduce the amount of breathable oxygen in air.

How can I protect myself from compressed gas hazards?

- Ensure proper storage and handling of gas cylinders and adequate ventilation.
- Use the right equipment for the specific gas you are working with.
- Check for leaks before attaching a regulator.
- Know the emergency procedures for gas leaks, fires, or other hazardous situations.

THERMAL HAZARDS

How can I protect myself from high heat during welding operations?

- Wearing appropriate personal protective equipment (PPE) can help prevent burns.
- Use welding goggles and helmets to protect the eyes from glare and flying sparks.
- Wear heavy leather gloves, protective long-sleeve jackets, long pants, and closed-toe shoes.

FLASHBACK

Flashback can occur in gas welding when the flame burns back up the hose lines. A resulting explosion in the hose could injure or kill the operator.

What can I do to prevent flashbacks?

- Make sure the system is equipped with a flashback arrestor.
- Operate the equipment at the recommended pressure.
- Equipment should be inspected regularly to ensure proper functioning.

PROHIBITED PRACTICES

Hot work must not be performed in areas:

- Requiring authorization before it has been granted.
- Where the fire suppression system is impaired
- With a reasonable potential to contain an atmosphere of explosive gases, vapors, or dusts prior to venting.
- Near the storage of large quantities of exposed and readily ignitable materials
- Where there are pipes that are in contact with combustible walls, ceilings, roofs, or partitions where heat conduction may cause ignition.

Contact EH&S at 206.543.7262 for more information.