Tools & Machines – Welding/ Soldering/Brazing

Welding is the most common method of joining metals. Many times constructing a set involves metal fabrication, which requires metal welding and cutting. Soft soldering, using an electric soldering iron, is a common practice when working with lighting and audio wiring.

Brazing is similar to soldering; however, the temperatures used to melt the filler metal are higher. Welding, soldering, and brazing present significant hazards including exposure to hot materials, ultraviolet light, gases, fumes, noise, and heat stress. Only trained employees and students are authorized to operate perform welding, soldering, or brazing work.

General Safety

1. Protect all persons adjacent to the welding areas from the infrared rays through the use of noncombustible or flameproof screens or shields.
2. Require appropriate safety goggles for all persons who may view the welding or cutting operations.
3. Use all required personal protective equipment, such as leathers, gloves, welding helmets or hoods, leather shoes, fire retardant overalls, and goggles in all welding and soldering operations.
4. Inspect welding helmets, soldering goggles and hand shields for leaks, openings, or highly reflective surfaces. Replace them as needed.
5. Conduct cutting, welding, and soldering operations only in areas that are, or have been made, fire safe.
6. Conduct cutting, welding, and soldering operations in well-ventilated areas; use local exhaust ventilation, such as snorkel hoods or backdraft slot hoods to control fugitive emissions.
7. Maintain suitable fire extinguishing equipment ready for use during welding and cutting operations.
8. Maintain designated fire watches whenever cutting, welding or soldering.
9. Never use creams or ointments on burns. Expose the burned area to cold water for at least 15 minutes. Seek medical treatment for any large burns and/or if the burn is second degree (blisters) or third degree (the skin is charred).
10. Maintain your personal protective equipment in good condition. Talk to your supervisor or instructor if you have any questions about the requirements.
11. Ensure an emergency response burn blanket is available.
12. Discard welding rods, solder, and dross in accordance with the Campus Hazardous Waste Disposal procedures. Contact the EH&S Department if you are unsure.

13. Do not store, prepare, or consume food and beverage in or around areas where cutting, welding, or soldering operations occur.
14. Always wash your hands with soap and water upon completion of welding and soldering work and before preparing or consuming food and beverages.

Gas Welding

1. Store and transport compressed gas cylinders in the upright position with the valve protective caps on. In addition, secure the cylinders in an upright position using two restraining devices made of non-combustible material, such as metal straps or chains; place the restraining devices within the top and bottom 1/3 of the tank. Never use ropes or canvas straps as these will be destroyed in a fire.
2. Ensure cylinders in portable service are secured in an upright position.
3. Never store or place cylinders where they are exposed to heat, flame, impact, electric arcs or circuits, high temperature process equipment, or sparks.
4. Tag empty cylinders with an "EMPTY" tag, and store them separately from full ones with the valve cap in place.
5. Ignite torches using only friction lighters or other approved devices.

Arc Welding and Cutting

1. Remove electrodes from the holders prior to leaving the area. Situate holders so as to prevent student or employee injury.
2. Keep the power supply switch in the off position when arc welders or cutters leave or stop work and when machines are moved.
3. Never unplug a machine while it is in the "on position."
4. Require all students, employees, and observers to cover their skin completely while conducting or observing welding operations to prevent ultraviolet burns or damage.
5. Keep power cables and welding leads clear of walking and working areas to reduce the potential of a trip and fall injury.

Soldering and Brazing

1. Always wear appropriate protective eyewear. Soft soldering using an electric soldering iron does not require tinted safety glasses or goggles; however, protective eyewear must be worn as solder can spit and create an eye hazard from the molten metal. Brazing and torch soldering require tinted safety goggles or helmets due to the higher temperatures and potential exposure to ultraviolet light.
2. Use lead free solder to reduce the potential exposure to lead fumes, dust, and debris.
3. Conduct soldering operations on a fire-proof or non-flammable surface to reduce the risk of fire. Keep the work area clean and free of clutter and combustible materials.
4. Always use a secured soldering stand, and always place the soldering iron in the stand when you put it down.
5. Never touch the tip or element of the soldering iron to check if it is hot.
6. Allow the work piece to cool prior to touching it.
7. Let the soldering iron fall if you drop it; NEVER try to catch it as it falls. Immediately, pick it up by the handle and place it in the stand.
8. Always unplug the soldering iron if you have to leave the area and when you finish the job.
9. Never leave a hot soldering iron unattended.

Talk to your supervisor if you have any questions about this information.