



Safe Soldering Work Practices

Soldering is the process of combining two base metals via a filler solder metal with a lower melting point. In this process, the metals being joined are heated to the soldering temperature but do not become liquid, only the solder liquefies. In addition to the joint and the base metals, soldering operations may involve the use of fluxes, coatings, and cleaning agents.

Soldering presents potential exposures to the materials and by-products via inhalation, skin contact, and hand to mouth routes. The use of lead-containing solder presents the potential for exposure to lead, which can cause neurological toxicity and other health effects. The use of rosin core solder or flux presents the potential for exposure to rosin fume, which can cause irritation and sensitization of the eyes and respiratory tract. The high temperatures of the solder gun and melted solder create the potential for burns or an ignition source for combustible materials.

This safe work practice applies to electronic hand soldering using a soldering iron or soldering gun. Safe work practices for torch soldering are contained in the HVCC Hot Work Safety Program. This document and safe work practices should be used by all employees and department heads performing electronic soldering to ensure awareness of the hazards and minimize any hazards posed by soldering operations.

Safety Precautions

1) Soldering Iron Safety

- Never touch the element or tip of the soldering iron. It is very hot (about 400°C) and will burn.
- Hold wires to be heated with tweezers, pliers or clamps to avoid receiving burns from objects that are heated.
- Keep the cleaning sponge wet during use.
- To the extent possible, conduct soldering on a solid, level surface and always return the soldering iron to its stand when not in use. Never put it down on your workbench. Be sure the iron is secure in its stand so it cannot inadvertently dislodge onto the work surface.
- Turn unit off or unplug the iron when not in use. Soldering stations that feature an automatic shut off not only extend the life of tip, iron and station, but provide an additional measure of fire safety.

2) Exposure

Avoid inhalation of soldering smoke/fumes. The smoke formed during soldering is mostly from the flux. Inhalation of flux fumes during soldering may cause irritation and damage of mucous membranes and respiratory system. Eyes may become irritated from contact with smoke from soldering. To reduce exposure:

- Conduct work in a well-ventilated area.

- Avoid breathing fumes/smoke by keeping your head to the side of, not above, your work. The Addition of a small fan positioned behind the worker to blows air across the work area can help move fumes away from the breathing zone.
- Use lead free (preferable) or low lead solder whenever possible.
- Keep cleaning solvents in dispensing bottles to reduce inhalation hazards.
- Always wash your hands with soap and water after soldering

3) Personal Protective Equipment

To prevent burns from splashes of hot solder, long sleeve shirts or lab coats and pants that are made of natural fibers (cotton) and closed -toe shoes should be worn. Safety glasses or goggles should be used when soldering and clipping wires.

4) Electrical and Fire Safety

- Soldering units should be UL (or equivalently) listed.
- It is a best practice to use a soldering iron equipped with a grounding prong to reduce the risk of electrical damage if a short circuit occurs in the equipment. A ground fault circuit interrupter (GFCI) should be employed if contact with water is a potential. If the circuit isn't hardwired with a GFCI, a portable unit should be used.
- Examine equipment for frayed or cracked cords or missing ground prong before each use.
- Immediately take out of service any equipment that is not in good working order.
- Prevent damage to electrical cords during soldering. Keep them away from heated tips. Grasp the plug, not the cord, when unplugging the unit.
- Conduct work on a fire-proof or noncombustible surface that is not easily ignited.
- Wear nonflammable or 100% cotton clothing that covers your arms and legs to help prevent burns.
- A fire extinguisher should be present in the area. Know where it is located and how to use it.