

# Soldering Safety Guideline

## SCOPE

This guideline covers common hazards associated with soldering with an electric soldering iron. It is not applicable to torch soldering or other soldering methods.

Note: This guideline is supplemental to manufacturer's documentation such as operator manuals and Safety Data Sheets. Where there are discrepancies, the manufacturer's documentation takes precedence.

## CHEMICAL HAZARDS

Soldering generally involves a metal alloy and flux. Both can contain hazardous chemicals. **Consult the manufacturer's Safety Data Sheets (SDS)** for the most comprehensive documentation of these chemicals. SDS are available from your instructor or supervisor. This is especially important if you have allergies, asthma, or other underlying health conditions.

### Lead Exposure

Many solder alloys contain lead. **Use lead-free solder when possible.**

The U.S. Environmental Protection Agency (EPA) has classified lead as a probable human carcinogen.

Lead affects the body similarly whether it is inhaled as a particulate or ingested. It can impact nearly every organ and system. The nervous system is particularly vulnerable in both children and adults.

Long-term exposure can lead to diminished learning, memory, and attention, as well as weakness in the fingers, wrists, or ankles. It may also result in anemia and kidney damage.

Additionally, lead exposure can elevate blood pressure, especially in middle-aged and older individuals. Exposure to high levels can cause severe harm to the brain and kidneys, potentially resulting in death.

In pregnant women, high lead levels may induce miscarriage, while in men, it can harm reproductive organs.

### Flux Exposure

Rosin and acid are common flux compounds. Rosin flux is generally safer and should be used when soldering electronic components. Acid flux is used for applications such as plumbing. Consult the appropriate SDS for the flux you will be using. Avoid skin and eye contact with flux.

## Solder Fumes

Solder fumes can cause respiratory irritation and can lead to asthma. Always work in a well-ventilated area and use positive fume extraction where possible.

## PHYSICAL HAZARDS

### Burn Risk

Soldering uses high temperatures to melt the solder alloy. Avoid contact with skin, hair and clothing. Be advised that molten metal can drip from the solder joint. Solder over a table or workbench to reduce the risk of injury from molten metal.

Many materials conduct heat easily. Be careful not to touch materials that are near the solder joint. Also, tools such as tweezers can conduct heat and cause burns.

## ELECTRICAL HAZARDS

Soldering is often used to make connections in equipment that uses dangerous levels of electricity. Be sure that all equipment is disconnected from the power supply and any residual voltage is at a safe level before proceeding. Equipment that may be powered up by other must be locked out and tagged out before proceeding.

## ENVIRONMENTAL HAZARDS

Lead containing scrap and supplies such as rags and towels that have been used to clean lead solder are considered hazardous waste. These should be placed in a sealed plastic bag and disposed of as hazardous waste.

## Risk Mitigation

- Handle the soldering iron properly. See manufacturer's operating manual.
- Always return the soldering iron to its holder. Never lay an iron directly on a table or workbench.
- Use lead-free solder where possible.
- Wear long sleeve shirt and pants made of natural fiber.
- Wear eye protection.
- Solder over a table to reduce the risk of molten solder dripping on skin.
- Do not sand or grind lead solder.
- Avoid touching your face or mouth after you have handled solder.
- Use positive ventilation where possible.
- Disconnect any equipment to be soldered from its power supply.
- Dispose of lead contaminated waste in a sealed plastic bag. Process as hazardous waste.
- Wash hands thoroughly when done.

## References

<https://wwwn.cdc.gov/TSP/ToxFAQs/ToxFAQsDetails.aspx?faqid=93&toxid=22>

NOTE: The information in this document believed to be accurate but is provided as informational as—is and without warranty. Please remove the ET logo if modifying this document.

© 2024, EngineeringTechnology.org