



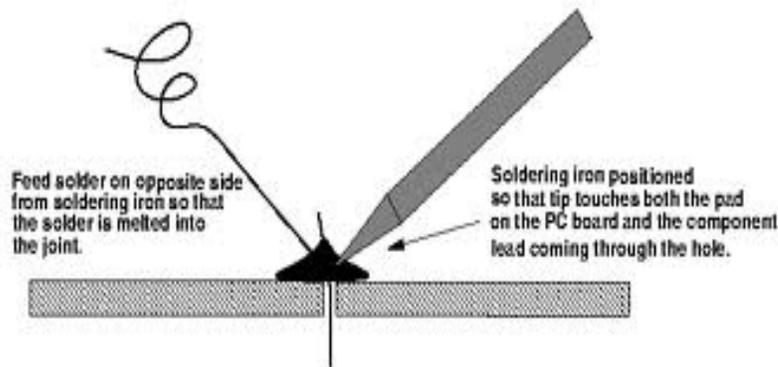
Naval Support Activity Monterey /
Naval Postgraduate School



SAFETY GRAM

29 September 2014

SOLDERING



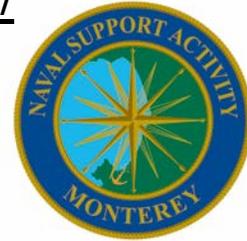
Background: Soldering is a process that produces a joining of materials by using a filler metal (solder) with a temperature not exceeding 840 degrees F (450 degrees C). The metals being joined are heated to the soldering temperature but they do not themselves become liquid; only the solder becomes liquid. Most soldering consists of electronic hand soldering, using a soldering iron or gun. Soldering can also be done using a torch. In addition to the solder and the base metals, soldering operations may involve the use of fluxes, coatings, and cleaning agents.

Both electronic soldering and hard soldering present potential hazardous exposure issues through airborne and/or skin contact. The exposure can come from the products used or by-products of the soldering process. There are physical hazards from heat or open flame. Also, the fumes produced from soldering operations are potentially dangerous; such fume is also known as colophony. Colophony is a complex fume containing particles and gases that are potentially hazardous to health if inhaled.

Purpose: The purpose of this Safety Gram is to bring awareness to personnel about the process of soldering and the potential hazards by using soldering tools. This document is not all inclusive and additional training is required prior to your use in your departmental lab / machine shop. Additional training is needed for all new employees working with soldering tools.



Naval Support Activity Monterey /
Naval Postgraduate School



SAFETY GRAM

29 September 2014

Standard Precautions:

1. Lead and tin are the primary constituents of most solder currently used. Appropriate controls should be used and the best work practices include good ventilation providing adequate protection from fume exposure.
2. Solder fumes can contain many compounds of which 99.5% are particles and 0.5% gases. The compounds can consist of Lead oxide, Carbon monoxide, Hydrochloric acid, Isocyanates (react with compounds containing alcohol), and Isopropyl alcohol.
3. Although lead as part of a soldering material has tremendous value in terms of increased strength and durability and reduces the melting point of tin, lead-free solder should be used to the greatest extent possible to eliminate the health risks associated with lead.
4. Lead from paint or residue from solvents used in surface preparation can produce toxic fumes, gases, and vapors. Oils, paints, and coatings should be removed from the surfaces to be heated during soldering to prevent the substance from turning into a vapor.
5. When soldering with Teflon materials, work should always be done with a local exhaust ventilation system. Exposure to Teflon fumes can cause influenza-like syndrome.
6. Solder fume is one the top causes of occupational asthma in the workplace and can also cause an irreversible allergenic reaction in the respiratory system. Further exposure to the substance will produce symptoms that include Bronchitis, Sionasal cancer, and carcinogenic diseases (heart/lung).
7. Skin exposure to rosin-based solder flux, flux residues, and the fume itself can cause dermatitis. Wearing long-sleeved clothing and gloves can prevent skin contact. Even those who occasionally solder should be aware of early symptoms associated with respiratory effects of rosin-core solder or rosin flux. These include watery and prickly eyes, runny or blocked nose, sore throat, cough, wheezing, or breathing difficulties.
8. Burns and fires: Burns can result from touching the hot objects associated with soldering, such as the soldering iron or surfaces heated by the iron. Work practices should be used to prevent contact with hot objects. Burns and fire hazards are both present when a torch is used for soldering.
9. Even when there is no exposure to lead fumes, there is still a need for safe work practices to prevent employee exposure to lead from other routes. To prevent the ingestion of lead, hands should be washed with soap and water before breaks, lunch, at the completion of soldering, and at the end of the work day. Work areas should be kept clean and wiped with a damp paper towel to minimize the accumulation of lead dust in the work area. Food should not be taken in the work area where soldering is done.
10. Any signs or symptoms of irritation should be reported immediately to your supervisor and to the Safety Office at (831) 656-2822. Please contact Eric Thurston, Industrial Hygienist, at 831-656-2477 to monitor the exposure to compounds if soldering is being used.