

WORKSHOP PRACTICE

SOLDERING

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INDUSTRIAL ENGINEERING DEPARTMENT

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WHAT IS SOLDERING

- Soldering involves joining two components of metal with an intermediate metal whose melting temperature is lower than the parent metal.
- **The tools needed for the soldering process:**
 - Safety glasses
 - Soldering iron
 - Solder
 - Wire cutter
 - Damp sponge

TOOLS



- Assemble the proper tools together.

WHY SAFETY GLASSES

- It is important always to wear the safety glasses during the whole soldering process to protect your eyes against boiling solder particles that fly up while the solder is melting and pieces of leads that might fly in any direction when they are cut.

WHAT IS A SOLDERING IRON

- The soldering iron is the tool that is used to heat the joint. It has a tip that is heated by an internal heating element.

SOLDERING IRONS



Pencil tip



Temperature Controlled

WHAT IS SOLDER

- Solder is the material that melts on the joint attaching to both the component lead and the pad on the circuit board.



REQUIREMENTS OF A SOLDER

- Fuse safely below the **sag or creep** temperature of the parent alloy.
- Resist tarnish and corrosion.
- Non pitting.
- Free flowing.
- Match the color of the parent metal.

COMPOSITION OF SOLDERS

- Gold
- Silver
- Copper
- Tin
- Zinc
- Gold solders are designated by fineness.

SOLDERING FLUX

- Flux means flow.
- Improve the flow of a metal
- Chemicals that limit the flow of metals are called *antifluxes*.

FUNCTIONS OF FLUX

- PROTECTOR
It covers the metal surface and prevents oxide formation.
- REDUCER
It helps to reduce the oxides present on the metal surface.
- SOLVENTS
It dissolves any oxide presence and removes it.

COMPOSITION OF A FLUX

- Common fluxes are: ammonium chloride for soldering tin
- Hydrochloric acid and zinc chloride for soldering galvanized iron (and other zinc surfaces)
- Borax for brazing or braze-welding ferrous metals.
- Boric acid
- Silica



ANTIFLUX

- Used to control the flow of the metal.
- Most common anti-fluxes used is graphite.
- Better fluxes like Rouge in chloroform can be used.

OVEN SOLDERING

- Performed under vacuum or air.
- A piece of solder is placed in the joint space and it is heated to a standard temperature in the furnace.
- Superior joint strength.

DISADVANTAGE

- The parent metal will sag or melt if heated for o long time.

TORCH SOLDERING

- Soldering is done under direct flame.
- A gas air torch is used for this purpose.
- The torch flame has two parts – the reducing part (is at a higher temperature) and the soft brush part.
- The solder should be melted using the soft brush flame.
- The flame should be constantly swiped over the solder for a period of 4 -5 minutes.
- At no point of time the flame should be held in a stationary position.

INFRARED SOLDERING

- Used for low fusing connectors.
- Good accuracy.
- Similar strength as conventional soldering.
- Protective eyewear is necessary.

QUESTIONS