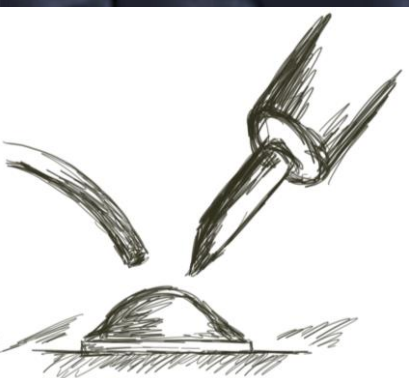


SOLDERING IN ELECTRONICS

Soldering is the most common method to form electrically conductive interconnections. Several techniques may be used in soldering – for example hand soldering, wave soldering and reflow soldering.



SOLDERING PROCESS

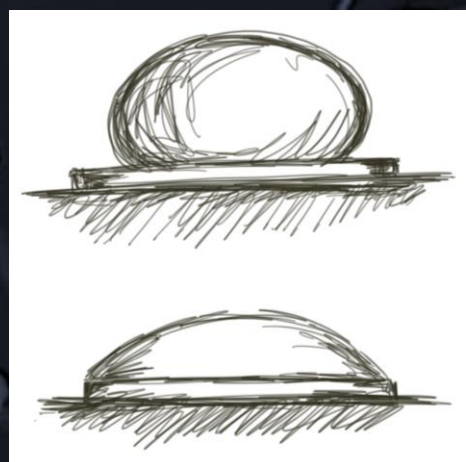
In soldering process solder is heated above its melting temperature. The formed liquid solder then reacts with a solid surface and a metallic interconnection is formed.

Clean surface is needed for the solder to react. Flux is used to clean the surface and to improve wetting. Several different fluxes are available.

WETTING

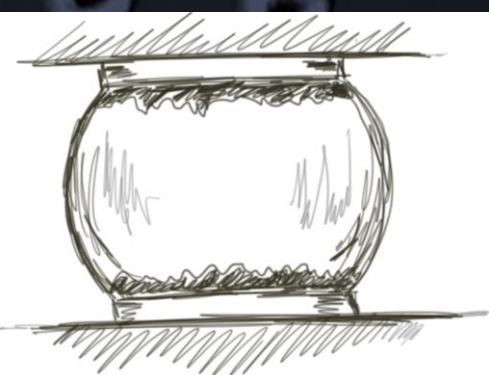
Good wetting is critical for the formation of good quality solder joint. **Wetting describes how well solder spreads onto surface.**

To ensure good wetting, suitable flux and temperature are critical. Additionally, surface finish may be used on copper pads to improve wetting. Typical surface finishes include, for example, OSP (Organic Solderability Preservative), ENIG (Electroless nickel immersion gold) and HASL (Hot air solder leveling).



INTERMETALLIC LAYERS

In soldering a chemical reaction occurs between solder and soldered surface. In this reaction an intermetallic layer is formed between the solder and the surface.



The composition of the intermetallic layer depends on the surface and solder material. For example Cu_3Sn and Cu_6Sn_5 are common intermetallic layers when tin containing solder is used with copper pads.

Formation of an intermetallic layer is required to form joints. However, thick intermetallic layers can be very fragile and lead to reliability problems.

COOLING

The final stage of soldering process is cooling. Cooling rate is important, as it affects the intermetallic layers and the crystal structure of a solder joint.