

Lead-Free FAQ

Q: What is EFD suggesting for a lead-free alternative to 63/37?

A: EFD is a member of the Solder Products Value Council (SPVC). As a group, the SPVC is suggesting the use of tin/silver/copper (SAC) alloy. The specific alloy EFD is recommending is Sn96.5/Ag3/Cu0.5, which has a liquidus temperature of 218^oC.

EFD can also provide a wide variety of alternative alloys, including tin/silver, tin/antimony, tin/bismuth and 100% tin. These alloys are available in a variety of flux compositions for both stencil and dispensing applications.

Q: What difference(s) should I expect to see?

A: There are several differences you will see. The most obvious is the necessity for increased reflow temperature. EFD recommends a peak temperature of 20-40^oC above the liquidus temperature of the alloy in use.

Visually, the fillets will appear as having a matte finish, not as bright and shiny as the tin/lead alloy. This is a physical property of the alloy related to the crystal structure. Some retraining of the inspectors may be necessary to avoid rejection of good joints as "cold."

Q: Will IPC be publishing a new specification for inspection of lead-free solder joints?

A: IPC is currently working to revise the specification for inspection of lead-free solder joints.

Q: What about reliability?

A: Reliability is related to many variables. They include the alloy, surface finishes and processing. It would be almost impossible for EFD to study all the variables. Reliability should be determined for the end product. However, reports from the field indicate reliability will not be sacrificed when the SAC alloy is implemented into the process properly. EFD can supply data such as tensile/shear strength, fatigue resistance, etc. upon request.

Q: I am using an alloy for chip attach that has a liquidus of 290^oC (Sn10/ Pb88/ Ag2), what do you offer for this application?

Please contact your EFD Solder Paste specialist with further questions at **800-338-4353**.

A: Currently, there is no viable lead-free alloy with this liquidus temperature. For this reason, there is an exemption for alloys with high liquidus temperatures that contain greater than 85% lead.

Q: How will the change to lead-free affect my printing (dispensing) parameters?

A: With proper formulation, you should see no difference in printing or dispensing properties when making the switch to lead-free.

Q: Will I need to change my stencil design?

A: You should not have to change your stencil design to accommodate the change to lead-free.

Q: I am currently using HASL boards. What board finish should I look into to make the switch to lead-free?

A: There are currently several available board finishes that are lead-free. They include Electroless Nickel Immersion Gold (ENIG), Immersion Silver, Immersion Tin, and copper with OSP (Organic Solderability Preservative). Each displays different properties for solderability, etc. They should be evaluated for their performance in your application.

Q: How do I keep my employees from mixing lead-free and leaded solder and equipment on the line?

A: A thorough inventory of all solders being used should be conducted. List every place where solder is currently in use. This includes rework/touchup as well as hand soldering applications. Be sure to replace any items such as soldering iron tips that have been in contact with lead-bearing alloys.

Q: Is there a lead-free alloy which produces a joint capable of withstanding exposure to SAC alloy reflow temperatures during multi-step component solder attachment?

A: Yes, a lead-free alloy with a reflow temperature range from 242^o C to 263^o C is now available. This alloy provides a safe-step soldering temperature margin and superior wetting and tensile strength (12,000 psi) compared to generally used Sn/Ag and SAC compositions.