

Notes on soldering / lead-free soldering

In cable soldering, use of incorrect temperatures and long delay times can lead to shrinkage of the conductor insulation at the point of soldering, particularly where the commonest forms of foamed conductor insulation (PE (polyethylene) and PP (polypropylene)) are used. The reason is that these materials have a fine porous structure and thus a lower plastic content.

What can go wrong ?

1. The solder tip temperature is too low, or the temperature control adjusts too slowly to thermal fluctuation during the soldering process.
2. Using solder tips that are too thin and/or too long or poorly cleaned will impair thermal transfer.
3. Use of solder wire that is too thin for the contact surface area to be covered will dramatically increase soldering time.

All these cases result in excessive delay times at the solder point.

They are problems that may occur with leaded solder but are likely to be more frequent with lead-free solder.

Lead-Free Soldering

The introduction of environmentally friendly lead-free soldering has initially resulted in production difficulties because the original lead content of 37% has been made up by substantially increasing the proportion of tin and other metals including silver and copper. However, these materials cause the melting point of the solder to rise by around 35° C, as well as significantly impairing wetting and flow properties.

As a result, special soldering stations with higher output and thermal capacity, precision temperature setting and faster, higher-performance thermal control are necessary.

We tested soldering stations from a variety of manufacturers. The key criterion was the precision and stability of the selected temperature at the solder tip during mass soldering.

Our test winner was the ERSA Digital 2000A.

Selection of the correct type of solder for the solder temperature, wetting and flow properties continues to be critical. We tested over 20 different lead-free solders. A wide range of alloys featuring different material compounds, types and proportions of flux and their associated patents are available. The lead-free solder we supply is easy to work with and features low melting point and outstanding wetting and flow properties !

Notes

- Lead-free solder joints have a slightly matter finish than leaded joints. However, this does not affect the quality of the joint; in fact, international tests have actually shown that lead-free solder joints have higher mechanical stability.
- Solder tip wear increases because of the higher temperature and more aggressive nature of the materials involved
- Lead-free soldering is a straightforward process providing that suitable materials and tools are selected.

IMPORTANT

- Always use suitable soldering equipment and solder.
- Always keep solder tips clean and free from scale and oxide
- In lead-free soldering, maintain but do not exceed a soldering temperature of 360°C.
- Do not leave the tip on the solder point for too long – approx. 1 second is enough to join the wire and the contact
- No pre-tinning of connecting wires necessary
- Never mix leaded and lead-free solder – this will impair the mechanical stability of the soldered joint
- KLOTZ a.i.s. cables with tinned wires or braided shields can be soldered using leaded or lead-free solder since they are tinned with pure tin