TECH BULLETIN

Title: Soldering Tip Care and Use

Model (s): All Weller® Industrial / Electronic Tips

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Editor: ???

Description:

When it comes to soldering irons, you know that the tip is the most critical component. While the soldering iron holds and heats the tip and controls its performance, the tip is tasked with the most important job of transferring heat efficiently and reliably to the connection point. Inadequate or improper tip maintenance is a leading cause of soldering problems.

To ensure good tip maintenance, you should keep the tip tinned with a thin coating of solder at all times. The coating also forms a heat bridge between the tip and the parts being soldered. It's difficult to heat parts efficiently with a dry (untinned) tip. With a tinned tip, the coating tends to flatten out as the tip touches the connection, creating a larger surface contact area, which in turn forms a more efficient heat path.

It's no secret that proper tinning optimizes tip life. All industrial / electronic grade tips consist of a copper base material, plated with iron to prevent erosion. However, if left unprotected, the iron plating will oxidize rapidly. When oxidation occurs, the working surface of the tip takes on a dull grey or grainy appearance, which will not wet with solder. This greatly reduces the transfer of heat. You may have encountered this condition on a soldering project. Chances are you likely discarded the oxidized tip. However, if the tips are cleaned carefully when they are at room temperature with a fine abrasive, they can be retinned once the tip is re-heated.

To prevent oxidation, keep the tip tinned with a thin coat of solder at all times -- not only during soldering but also when the iron is sitting idle in the holder.

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Remember, you should not only wipe the tip clean but retin the tip before starting your next soldering task. It's also important to apply a fresh layer of tin to new tips as soon as they are heated to the solder melting point; otherwise, they may ~~burn out~~ oxidize within minutes of use.

Another common cause of early tip failure is the use of active fluxes, either as liquids or cored in the solder. They can cause premature erosion of the iron plating, which begins to form pinholes in the plating. The tin will then enter into solution with the copper base material, creating large holes or pits on the tip surface and even larger holes inside of the iron plating. Tips that exhibit this condition should be replaced immediately.

Be aware that water-soluble fluxes can be corrosive at high temperatures and therefore can be especially damaging for tips. Many companies use water-soluble fluxes only during wave soldering followed by thorough aqueous cleaning to reduce flux residue on the circuit board.

The use of wire solder cored with water soluble flux during touch-up and rework operations can still result in very rapid tip failure. One way to minimize the problem is by using a high quality, mildly active rosin (RMA) core flux during rework.

We've seen an increase of no-clean fluxes in the global marketplace. No-cleans are designed to be used for soldering very clean parts where minimal cleaning action is needed. This very mild cleaning action is generally sufficient to clean the low oxidizing components and PCB assemblies, but is usually insufficient to clean normal oxides from soldering iron tips.

With recent changes to the solder alloy market (e.g. Lead Free, Water Soluble, No Cleans, Synthetic Resins, etc.) flux formulations have also had a need to change. Due to some of the flux fomulation changes, surface contaminaiton has become a large contributor to tip life failure in the form of „charring or carbonization" (or blackening) on the tips surface. Carbonization is very different from oxidation and is much more difficult to remove once it has occurred.

Carbonization or blackening is not a factor of the tip and cannot be caused by the tip itself, but instead is caused by a material that is not compatible with the process or the temperatures being used. In many cases, the temperatures being used in

the application along with the flux formulation contribute greatly to this premature tip surface failure. One recommendation is to always contact the solder manufacturer to determine what the recommended maximum soldering temperatures are for a specific flux formulation. Even then, charring can still occur.

If carbonization occurs, with the tip at room temperature carefully clean the surface with the Weller WPB1 Polishing bar (or with a mild abrasive) to remove the surface contaminant. Once the tip is cleaned and ready to be re-heated, you can use the Weller Lead Free Tip Activator (Order #: T0051303199) to re-tin the tip as soon as it reaches solder melting temperature (~ 400° F / 200° C), or you may use a commercially available rosin activated flux cored solder, such as Kester #44. Once the tip is accepting solder, reapply the Weller Tip Activator (or the Kester # 44 flux cored solder) as often as necessary to keep the tip in normal working condition.

Questions? We’re here for you.