



Lead-Free Soldering. Are you Ready?

Our thanks to American Beauty for allowing us to reprint the following article.

Lead-free solders present problems primarily because of the higher melt temperatures that are often required and the increased percentage of tin that is being used to manufacture several of these solder alloys.

Resistance Soldering Systems tackle the issue of higher melt temperatures.

Resistance soldering equipment gives you the ability to develop an intense, localized level of heat directly where required so that the actual soldering takes place quickly and with less heat dissipation into the solder joint. (Heat dissipation into the 'work' is the usual cause of unnecessary damage during soldering operations.) In some instances resistance soldering equipment offers the only process available that can reach the required temperature quickly and accurately enough to avoid thermal damage to heat sensitive materials or components. You can see why many companies are turning to American Beauty Resistance Soldering Systems in the face of a Pb-Free environment!

The principles behind resistance soldering are very simple to understand. In laymen's terms, our systems create a circuit whereby a safe, low-voltage, high-amperage, AC current flows from our power unit, through our hand piece, into the 'work' and back. The very 'tips' of our hand pieces (the electrodes) are manufactured out of a highly electrically resistive material, while the rest of the electrical 'trip' occurs over a path with a much lower resistance coefficient.

Electricity Resistive Material = Intense Heat. Unlike a traditional soldering iron that requires time to generate and store heat before transferring it into the 'work', the tips of your resistance soldering hand piece will literally become instantaneously hot. It is often the case where the joint being soldered offers additional resistance to the equation, creating an even higher level of available heat. The required operating temperature can be easily controlled, simply by regulating the low AC voltage being supplied to the hand piece from the power unit, a feature that is common to all of our systems.

For more than fifty years people have been turning to the American Beauty brand of resistance soldering equipment to fulfill their need for increasing temperature requirements and a more efficient soldering process. You will find that we offer the broadest array of resistance soldering hand pieces, the safest power units and the best technical support in the marketplace.

Because of the higher temperature availability with the use of resistance soldering equipment the transition to lead-free solders will not cause any loss in the efficiency of your process. If you have never tried resistance soldering equipment and are considering a transition to lead-free solders this is an excellent opportunity to look into this type of equipment to overcome any new or even existing problems associated with high temperatures or thermal damage.

General Purpose Solder Pots take on the increased solvent power of Tin (Sn).

Naturally a legitimate concern regarding a lead free environment is the effect that these solders will have on your solder pot's performance on a day-to-day basis. Not only do lead free solders require more heat capacity, they generally have higher percentages of tin than regular solders. These high levels of Sn can present a real problem as they are known to dissolve various metals, creating contamination and product reliability issues. American Beauty General Purpose Industrial Solder Pots were designed to be able to resist the solution activity of tin by incorporating a grey cast iron crucible to hold the solder bath. During the initial charging (filling & first heating) of the solder pot, there is a bonding that takes place between the grey cast iron crucible and the tin in the solder which creates an intermetallic (FeSn₂) layer that is extremely insoluble in tin based soldering alloys. If operating temperatures are kept below 800°F, the higher percentage of Sn should have no effect on your American Beauty Solder Pot's performance.

Although American Beauty solder pots may be able to obtain higher operating temperatures it is recommended that they be operated below 800°F in order to help preserve the protective layer that has been formed. Proper procedure for operating a solder pot states that the solder bath should be maintained at 100-150°F above the liquid temperature of the solder alloy. An examination of most lead free solder alloys on the market will reveal melt temperatures well below 650°F. Therefore, it would reason that one should not have to operate your solder pot above 800°F and therefore one would not have to worry about degrading your pot's protective layer.

