

## How do you ready a solder pot for lead-free solder?

It is important to first insure the solder is lead-free solder compatible. High tin alloys tend to leach iron causing dissolution of iron and solder contamination. The dissolution can advance to the point of causing micro-cracks and thinning of the walls, eventually resulting in a solder spill.

Materials that are lead-free solder compatible are:

- Titanium
- Cast iron
- Ceramic coatings
- Melonite coatings
- Specialty coatings, unique to the equipment maker

If a pot is lead-free compatible but contains leaded solder it can be cleaned before lead-free solder is added. Cleaning is very important to avoid the introduction of lead.

The limit required as per RoHS Directive is only 0.1%. Most lead-free solders will contain a small amount of lead in the range of 0.05%; there is little room for unintentional contamination.

A standard procedure for wave machine cleaning is detailed below:

- Empty the pot completely
- Drain any remain solder
- After cooling use a scraper to gently remove any visible leaded solder
- Avoid damage to the metal finish during scrap down
- Clean ducts, baffles and impeller mechanism thoroughly
- Clean conveyor chain and fingers with a steel brush, removing all lead-bearing solder particulates.
- Fill machine with pure tin to clean any remaining leaded solder
- Run system at 500° F for 2 hours, circulating the solder
- Empty completely, removing all visible excesses
- Refill with lead-free solder
- Do an analysis for lead and iron after running pot for one hour

For dip pots and selective soldering pots, the cleaning is simpler but complete removal of leaded solder is required and a tin fill is a less demanding process since the volume is substantially less. A pot analysis for lead and iron is still required.

**Note:** If a tin wash is not performed it becomes imperative to remove all traces of leaded solder in all parts of the solder pot area. The risk is highly increased in reference to lead contamination. Tin washing is therefore preferred

**About the author:**

Peter Biocca is Senior Market Development Engineer with Kester in Des Plaines, Illinois. He is a chemist with 24 years experience in soldering technologies. He has presented around the world in matters relating to process optimization and assembly. He has been working with lead-free for over 8 years, involved in numerous national and global consortia within this time; he has assisted many companies implement lead-free successfully.

He is an active member of IPC, SMTA, IMAPS and ASM. He is the author of over a hundred technical papers delivered globally. He is also a Certified SMT Process Engineer.

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