

Cross Contamination

By Michael Konrad, Aqueous Technologies



Mike Konrad
President/CEO

The leading manufacturer of cleaning and cleanliness testing products.

Aqueous Technologies
9055 Rancho Park Court
Rancho Cucamonga, CA
91730

Phone
(909) 944-7771

Fax
(909) 944-7775

E-mail
sales@aqueoustech.com

We're on the Web!
See us at:
www.aqueoustech.com

Cross Contamination in Stencil Cleaning Applications

Question: Can solder paste redeposit onto my boards if I clean them in a stencil cleaner?

Answer: For the sake of this discussion, it is assumed that the boards to be cleaned have not been heated and reflowed yet. After being reflowed, the entire process involving cleaning chemistries, time, and temperatures and methodologies would all need to be reexamined.

Cleaning stencils or misprinted boards will involve dissolving the pasty flux binder, and physical removal of the particulate solder components. It is necessary that the cleaning process be a "one way street", with the substrates being cleaned, but avoiding recontamination back onto subsequent substrates. The mode of cleaning and recontamination would be similar, whether from PCB to stencil or from stencil to PCB. Generally, only the later raises concerns due to the fact that the PCB may have extremely small vias or other small features. Of course, the cleanliness of the PCB is always a concern because it will become the final product!

When we examine the two components of solder paste, we see that cleaning them from a substrate uses two entirely different methods. The pasty flux binder ideally will dissolve into the cleaning solution. This solution should have good rinsing properties. Fortunately most do. Close examination of a washed and rinsed stencil will illustrate the typical rinsing properties of the wash solution. The large smooth surface and the sheeting action of the rinse water will show the relative surface tension differences between water, residual chemical and even any remaining flux (if improperly cleaned). It can be assumed that the rinsing properties of the wash chemical will be similar on a PCB, yet more difficult to identify visually because of the PCB features. If per chance, a small amount of flux did survive the wash and rinse process, the subsequent re-pasting and reflowing of the board will make the issue of little relevance.

The bigger concern is always the particulate solder. If this is not removed or is redeposited back onto a PCB, it can be a source of trouble. After the board is reflowed, the solder can form solder balls and cause present or future failures. Always be mindful that the more likely cause of wayward solder on a PCB is insufficient cleaning, not recontamination. One of the key advantages of an ultrasonic immersion tank is that the particulate solder will always drop to the bottom (once free from the board). Additionally, the cleaning solution is circulated throughout the tank, from top to bottom, via a pump and particle filters. Even without the physical filtration, it is hard to conceive that a heavy solder particle could levitate within the solution for a long enough time to

recontaminate the “next” substrate. Even if it could, it would have no motive to reattach itself. In fact, the ultrasonic action is actively removing the solder paste already on the next substrate. Additionally, the stencil (or PCB) does not rest on the bottom of the tank, so no potential sediment will be stirred up from the bottom.

For the sake of completeness, it should be noted that some manufacturers produce a “no-rinse” version of a stencil cleaner. These units typically do not dissolve the paste into the wash solution, but rather separate it from the substrate and let it float or sink within the tank. Great dependence is placed on the filtration system and the cycle timing, to assure that the paste (and solder) is not returned to subsequent substrates.

Other manufacturers have “spray-in-air” units. These units have the ability to “blast” solder particles under pressure onto a PCB; again greatly relying on the filtration system to prevent it.

Aqueous’ method of dissolution, gravity, rinsing, and filtration has never had a reported instance of recontamination onto another substrate.