Ask Les

Les Hymes

Outsourcing the Blame?

Split responsibilities can cause complications, so be sure that both companies document and report important process results.

Q: *We outsource the placement and soldering of most of the components on our printed wiring assemblies to a contract manufacturer (CM). To complete the assembly, we then customize the outsourced assemblies that the CM has produced and shipped to our plant. Our customization activities include adding additional soldered components and desoldering and removing some of the soldered CM components to meet specific customer requirements. I would appreciate some input on the following seemingly unrelated conditions we often encounter:*

1. *After customization, we often experience what appears to be a green corrosion product around the solder joints.*
2. *At times we also observe the presence of broken stranded wires both in-house before shipping the product, as well as later in service in the field. We are not sure what is causing the defects. We also are not sure if the broken wires are related to the observed corrosion product.*

A1: Although they may be related, I will address the occurrences as separate issues.

It would be wise to first identify and eliminate the source of the green corrosion problem since it may be causing or contributing to the broken wire defects. The green corrosion is most likely the result of an inadequate cleaning and rinsing operation at your CM, in your own shop after completion of your customizing operations or a combination of inadequacies in both cases.

The cleaning processes and materials being used may not be completely removing the flux residues and other contaminants associated with the soldering processes used by either your contract assembler or your in-house operation.

The assemblies received from the contract assembler must be adequately cleaned and rinsed in a timely fashion at the CM plant. The cleaned assemblies must be subsequently kept clean during transfer to your plant. It is recommended that the same flux be used in your plant and the CM plant and that cleaning operations in both plants be well documented, controlled and audited. Cleaning must occur soon after each of the soldering operations to avoid residue contamination problems.

To prevent the corrosion of the fine wires from entrapped flux when using stranded wire, both you and your CM should use RMA flux as recommended in the IPC documents. One of the commercially available, proprietary fluxes—such as HF1189 or HF1189A—that is based on a weak citric acid material would also be satisfactory. When used correctly and cleaned properly, no corrosion from flux residues left in the stranded wire should occur.

A2: If you or your CM use non-recommended fluxes, the broken wires you observe could be a result of corrosion of the stranded wires.

In addition to corrosion, poor handling can also cause broken wires. Shop practices for wire handling, processing and installation should be well developed, documented and understood by employees. Inadequate wire handling and stripping practices or careless handling by operators could nick the fine wires. Your significant wire breakage indicates a serious problem in one or more of the items mentioned.

Be sure to control the flux used in the soldering operation and clean the board after soldering in an adequate and timely manner. Overall good manufacturing practices should be in place.

I recommend that you require your CM to conduct periodic assessment tests on its cleaning processes and provide you with data confirming satisfactory cleaning results.

Your company may also want to perform cleanliness tests on incoming shipments of assemblies received. You should also perform cleanliness tests periodically on the customized assemblies after processing and cleaning in your shop. ■

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Send your process, technology or training question to lhymes@cox.net. Please type "ASK LES" in the subject line and indicate your name and company or institute affiliation. All questions may not be answered.