

No-Clean Flux Activation – Have All Flux Residues Been Catalyzed?

Should you worry about flux residue while using a no-clean flux? When STI's Analytical Lab reviewed three separate cases, each assembly failed either on account of voltage leaks or intermittent signal quality as a result of conductive ionic residue between fine pitch leads.

Each of these failures can be traced back to improper use of no-clean fluxes, which require adequate temperature and sufficient dwell time in order to catalyze properly, making the flux residue benign. Often the flux volume and location is also overlooked, which contributes to the amount of heat provided to a specific location.

Typically these problems arise during secondary touch-ups when temperature-sensitive parts must be soldered, potentially driving the no-clean flux away from the heat source and beneath adjacent components. This displaced flux often creates a leakage pathway for voltage or signals.

To address this issue and other potential failure opportunities, STI has developed a three-fold testing plan.

1. **What ionics are present in the no-clean cored wire solder or wave solder flux?** Because a range of solder iron temperature settings are required for various sensitive components, the amount of residue is affected. The amount of flux required also depends upon the soldering surface area – keeping in mind that heat drives residues away, leading to leakage pathways outside the intended soldering workspace.
2. **What temperature and dwell time is required for proper activation?** Assuming the assembly will accommodate local cleaning, some methods simply cut the residue concentration by spreading it across a larger surface area. While this is acceptable for certain applications, it is also necessary to determine the proper temperature and dwell time for the flux to catalyze. STI can help you address this issue with temperature and dwell time studies to define the proper parameters.
3. **A full ion chromatography of the board assembly is the final point of assessment.** Bear in mind that the board and components themselves may occasionally arrive dirty and should be tested to properly separate variables before evaluating the assembly.

This disciplined, multi-variable approach to testing accurately captures the data necessary to understand how flux catalyzes on a specific assembly. As component sizes shrink and board density increases, it is essential to know the proper soldering temperature and dwell time in order for a no-clean flux to properly perform.

This article is based on an original publication by STI.