

The Soldering Corner with Shantanu Joshi of Koki

The Soldering Corner provides expert recommendations to common soldering problems and new industry trends. Actionable solutions are based on everyday experiences with hundreds of electronics assemblers.



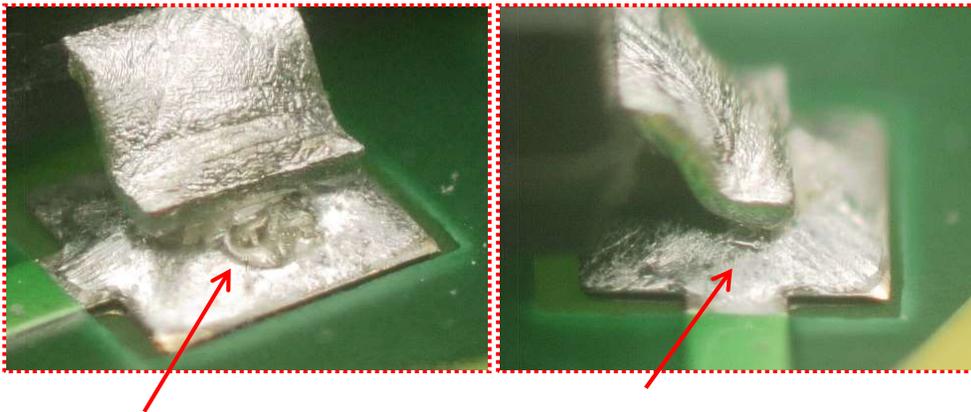
Problem: Eliminate Non-wetting and De-wetting

De-wetting occurs when the pad or component lead wets fully but retracts and leaves large parts of the pad or lead without solder. Non-wetting means that there is no solder on either the lead or the pad. The end result is either no, or severely weakened, electrical and mechanical connection.

There are many causes of wetting issues, including:

- Inferior plating
- Damaged plating
- Contaminated plating
- Foreign objects
- Improper reflow
- Inferior component fabrication

Microscope Image on De-wetting at SOT Solder Joint



Trapped Foreign Object

De-wetting on SOT Lead

The reality on the manufacturing floor, however, is that the process engineer may be locked into his BOM, at least in the near- to medium-term future. In that case, we need to focus on what we can change, namely the assembly processes. Common causes of non-wetting or de-wetting are that the flux has not had enough time to clean the surface, or that the flux evaporated early and allowed the surfaces to reoxidize prior to reflow. If you do not have the option of changing your PCB or solder paste, then at least make sure you do not use expired products. They should have a listed due date making this check easy enough.

Reflow can profoundly impact wetting so verify that your soak time is within the process window provided by your solder paste vendor. If the problem persists, then you may need to “push” your process window. Let me explain. The published process specifications will give good results in the vast majority of soldering applications. In the case referenced above, however, we

may need to target a narrower soak range within the overall process window. Because it may not be apparent whether your soak is too long or too short, you may need to experiment with changing the soak towards the lower end and then the higher end of the process window range to identify which profile provides the best result. I use a KIC profiler that has something called “sweet spot optimization” that allows me to enter the process window and a target within the process window range. That eliminates trial-and-error profiling when you are looking for the extreme corners of the solder paste process specifications.

For further defect analysis and countermeasures, visit
http://www.ko-ki.co.jp/en/memo/memo_analysis_mode_trends.html

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