

Champagne voids in wave or selective soldering

Introduction:

A printed circuit board that is wave or selective soldered has the potential for two types of voids in the solder joint connection. We differentiate:

- Blow holes, these are large voids that can be found close to the barrel or in the bulk of the solder. Blow holes are the result of outgassing of moisture from the board material.
- Champagne voids, these are a large number of small voids that are found in the solder at the intermetallic layer with a component or pad.

Root causes Champagne Voids:

The name, champagne voids, is related to the small bubbles that are typical for these phenomena. Figure 1 and 2 show voids along the lead of the component. The reason for these voids is an organic contamination on the metallization of component or board pads. In the early days this could typically be found at the surface of an immersion Ag finished pad (board suppliers have tackled this issue).

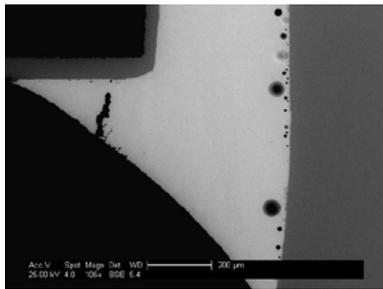


Figure 1: Champagne voids along the soldered lead

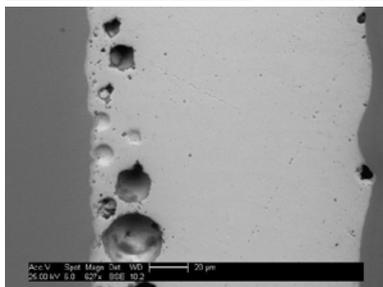


Figure 2: Left part of the picture is the lead. The right part is the copper barrel.

These contaminations related to the chemicals that are used in the production process of the components/pcb's.

Inspection criteria:

IPC-A-610, chapter 5.2.2 addresses the voids in the solder connection. Voids like in the pictures are *Acceptable* for class 1, and *Process Indicator* for class 2 and 3.

Preventive action:

The best method to solve the issue is to review the chemistry and process of making the components. In the soldering process a longer contact time may result in fewer voids (since the gasses have longer time to escape out of the liquid solder). The risk here is that longer contact time may result in copper leaching or increases solder bridging.