Vitronics Soltec

By G. Schouten

Solder webbing

Information Sheet 101

Introduction

Sometimes boards come for a solderline with stains or web like residues on the area that was in contact with the solder. This type of contamination from solder residues is called solder webbing.
Next the reasons for the occurrence of solder webbing will be explained.

Definition

Solder webbing is the result of residues of solderoxides and solder that can remain on board surfaces after a wave- or dipsoldering process.

Reasons for solder webbing

If solderoxides are not reduced by the flux, these oxides contact the board and can adhere to the board surface. On these adhering solderoxides some solder may adhere as well. Often these residues are like stains or webs covering the solderside of the board surface.

An oxide skin on the surface of liquid solder is normal when soldering under air. Normally the flux that is applied to the board before soldering should be able to reduce these oxides, so that only clean solder metal will contact the board when the flux is displaced by the solder. This clean solder has no possibility to adhere to the board base material, since that base material is not wettable by the solder. Actually the solder will repel from a non-wettable surface.

Only if there is no flux or flux activity left on the board when the solder contacts it, there is the possibility that the oxide skin that covers the solderwave can adhere to the base material.
If it will do so depends also on the type of solderresist and the process temperature.
Higher temperatures will faster exhaust the flux, but also weaken the solderresist surface, so that solder oxides can adhere more easily.

If the flux does not well adhere to the board surface soldering problems like webbing will be the result.
If the solderresist that is applied on the board is not properly cured, then the curing process may proceed during the solderprocess. As a result of that, a vapour film in-between the solderresist and the flux will be formed.
This will cause a serious problem because the flux can adhere to the solderresist, but is not able to adhere to a vapour blanket. As a result of the friction between the solderwave and the board, the flux will be whipped off almost completely so that it is unable to employ its full activity for the process.

How to avoid solder webbing

Be sure that the solderresist is properly cured and that the flux does properly wet the board.
Apply the correct amount of flux, according to the specifications in the flux data sheet.
Preheat the flux, according to the specifications in the flux data sheet, before the board contacts the solder.
Reduce the solder temperature and the contact time to those settings that will give still a good solder quality.

Tip from Soldering in Electronics SE Chapter 8.3.5.3:
"If the wetting of the solderresist by flux is inadequate, the addition of a small amount of turpentine to the flux may help."