

Technical Bulletin

Common failure mechanisms in conformal coating: Capillary flow

In conformal coating, there are several mechanisms that cause failure of printed circuit boards (PCBs). In a series of technical bulletins SCH will examine the common failure mechanisms in conformal coating including capillary flow, de-lamination, cracking, loss of adhesion, de-wetting, corrosion, orange peel, pinholes, bubbles and foam.

Definition

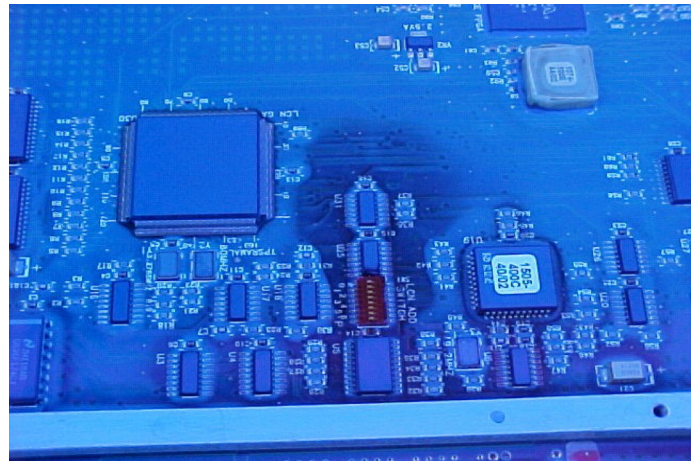
Capillary flow in conformal coating is where the coating pulls or runs away from certain areas of a PCB to more favourable sectors due to a combination of effects.

This leaves a patchy finish on the surface of the board.

Causes of Capillary flow in Conformal Coating

Factors that influence the capillary effect include:

1. low viscosity of the conformal coating
2. an abnormally high amount of coating applied
3. a low surface energy of substrate
4. the high surface tension of the conformal coating.



Examples of Conformal Coating Capillary Effects

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Examples are shown in the images throughout the bulletin where the conformal coating has drawn away from the flatter surfaces, finding it more energetically favourable to gather around the devices, producing a poor finish.

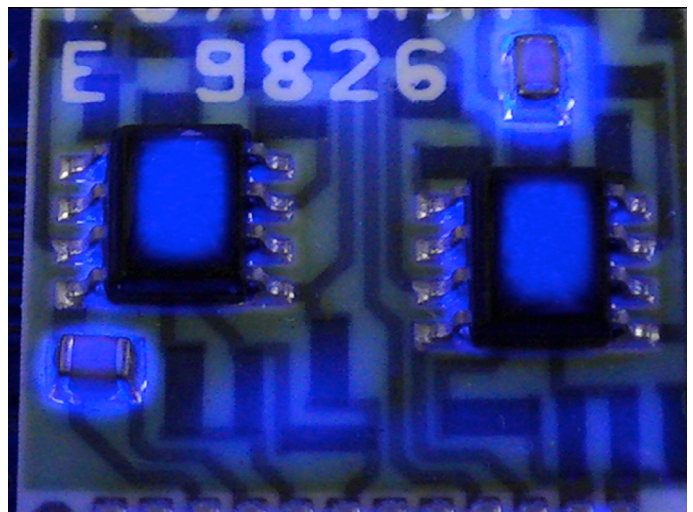
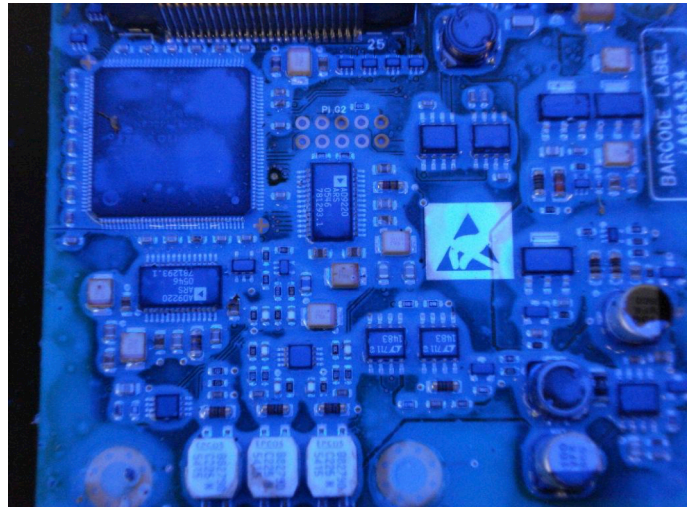
How to stop Capillary Effects in Conformal Coating

It is possible to minimise the capillary effects by using techniques such as

- Increasing the viscosity of the conformal coating
- Reducing the conformal coating film thickness
- Cleaning the board
- Use a solvent based material rather than water based or 100% solid conformal coating
- Heat board prior to coating

Available Bulletins

Common Conformal Coating Failure Mechanisms covering delamination, cracking, loss of adhesion, de-wetting, corrosion, orange peel, pin holes, bubbles and foam.



Examples of Conformal Coating Capillary Effects

SCH Technologies offer

- Conformal coating Subcontract Services
- Conformal Coating Application Equipment
- Conformal Coatings
- Conformal Coating Training courses
- Conformal Coating Consultation & troubleshooting