

## Technical Bulletin

### Common failure mechanisms in conformal coating: Orange Peel

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, delamination, cracking, loss of adhesion, de-wetting, corrosion, orange peel, pinholes, bubbles and foam.

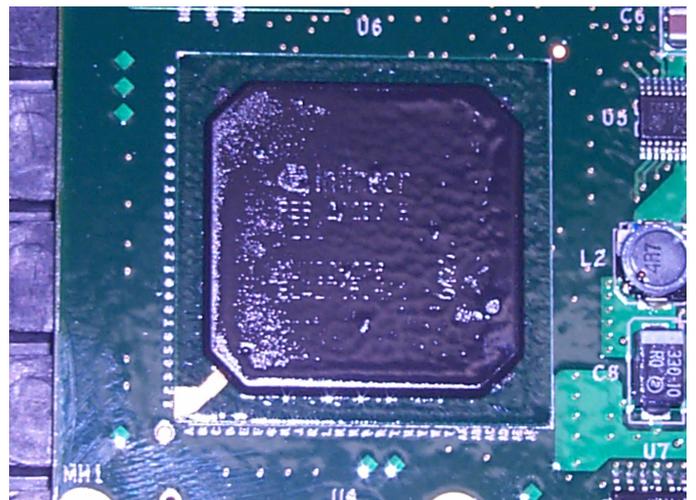
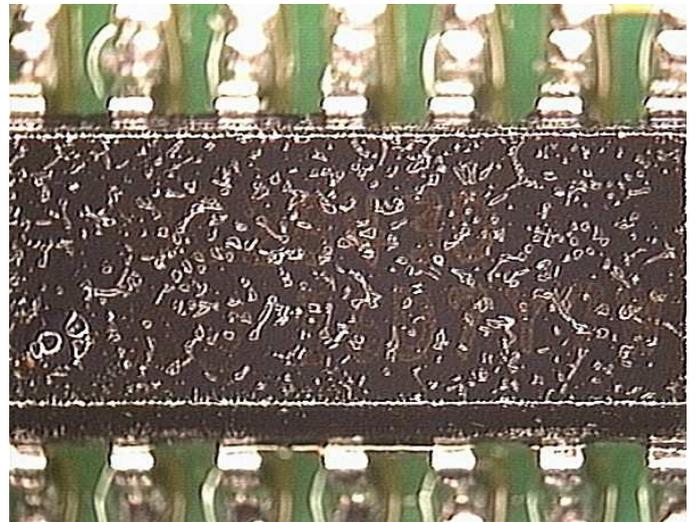
#### Definition

An uneven textured surface, often appearing dull, which looks like the skin of the orange.

#### Causes of Orange Peel in Conformal Coating

Factors that can cause orange peel effect include:

1. The improper application of the conformal coating. This manifests in aerosol or spray gun application where the coating is applied too far away from the PCB and the coating is too “dry” on the surface to level out.
2. The incorrect thickness of the coating where not enough coating is deposited so that there is insufficient conformal coating to self-level.
3. The incorrect cure profile when using an accelerated curing mechanism. This could be that the flash off zone before heat curing is inadequate or the oven profile is incorrect.



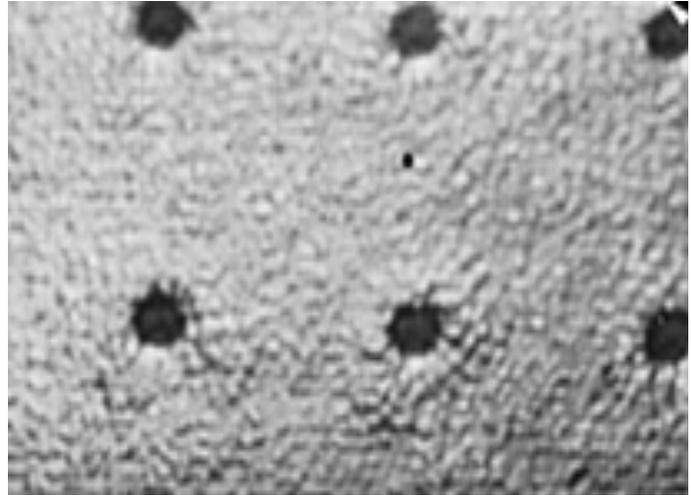
Examples of conformal coating orange peel effect.

## Examples of Orange Peel Effect

The main issue with orange peel effect is that the conformal coating may be too thin to offer adequate protection to the PCB.

## How to stop Orange Peel Effects in Conformal Coating

1. Reduce the viscosity of the conformal coating to allow the coating to level.
2. Reduce the air pressure to the spray gun to reduce the evaporate effects on the conformal coating.
3. Optimise the distance for spray application to the manufacturer specification when applying the conformal coating.
4. Ensure enough layers of coating are applied to form a levelled coating. This is especially true for aerosols that are susceptible to this issue.
5. Increase the flash off time for the solvents to evaporate before ramping up the temperature for elevated curing of the conformal coating.
6. Re-profile the curing oven using the conformal coating material suppliers recommended profile.



Examples of Orange Peel

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- Conformal Coatings
- Conformal Coating Training courses
- Conformal Coating Consultation & troubleshooting

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