

# Conformal Coating Defect

## Capillary (Wicking)

### Summary

Capillary flow (wicking) occurs when conformal coating is drawn away from target areas and pulled into gaps, underneath components or leads, or into interfaces. The result is a patchy, uneven finish with thin or bare regions that can compromise protection and reliability.



### Definitions

What is capillary flow / wicking in Conformal Coating?

- Definition: Coating is drawn into gaps/interfaces (e.g., under component bodies) and away from open surfaces, leaving patchy coverage.
- Main issue: Bare/thin regions reduce insulation resistance and increase moisture ingress risk, especially around fine-pitch and components that are not underfilled.

### Root Causes

- Low viscosity / high wetting material — coating readily flows into micro-gaps and interfaces.
- High volume films — excessive deposit re-distributes before solvent flash-off.
- Change in surface energy across PCB or contamination — preferential wetting around components rather than across laminate.
- High coating surface tension relative to substrate finish and geometry.
- Geometry & orientation — narrow gaps, capillary channels, and vertical features pulling on the film.

### Prevention / Best Practices

- Increase effective viscosity — higher-viscosity mix or staged passes with flash-off.
- Reduce film build — lighter coats; avoid pooling around component bodies and leads.
- Improve cleanliness — raise surface energy via validated clean / rinse / dry cycles.
- Match chemistry — select coatings with suitable flow / level properties for geometry (solvent-based often easier to tune).

- Board orientation & fixturing — tilt to discourage draw into gaps; add edge dams / masking where practical.
- Thermal conditioning — controlled pre-warm and flash to shorten capillary dwell time before cure.
- Selective application tweaks — reduce flow rate and pass overlap near capillary-prone features.

## Troubleshooting & Diagnosis

- UV/white-light inspection — map thin / bare zones around components and along gap lines.
- Thickness checks — coupons and on-board features to confirm under-build around edges / leads.
- Viscosity/solids monitoring — restore target windows; check for solvent loss.
- Application recipe review — head type, distance, pressure / flow, overlap strategy.
- Orientation trials — A/B test tilt / fixture changes and flash intervals to suppress wicking.
- Masking aids — temporary dams / latex seals near problematic gaps.

## Related Defects (Links)

- [Pinholes, Bubbles & Foam](#)
- [Orange Peel](#)
- [De-wetting](#)
- [Delamination](#)
- [Cracking](#)
- [Corrosion & Ionic Contamination](#)
- [Capillary / Wicking Around Components](#)

## Training & Services (SCH)

SCH offers conformal coating training that goes beyond theory—recognising and preventing pinholes, bubbles, foam, orange peel, de-wetting, delamination, and cracking. We cover process analysis, troubleshooting, materials, and application methods.

## Why Choose SCH Services?

Partnering with SCH Services means more than just outsourcing — you gain a complete, integrated platform for Conformal Coating, Parylene & ProShieldESD Solutions, alongside equipment, materials, and training, all backed by decades of hands-on expertise.



25+ Years of Expertise — Specialists in coating technologies trusted worldwide.



End-to-End Support — Guidance on coating selection, masking, inspection, and ProShieldESD integration.



Scalable Solutions — From prototype to high-volume production.



Global Reach — Support across Europe, North America, and Asia.



Proven Reliability — Built on quality, consistency, and customer satisfaction.