

Epoxy Conformal Coatings

Conformal coatings are applied to printed circuit boards (PCBs) to protect them from environmental stress such as salt, corrosion, humidity, and moisture, mitigate tin whiskers, and provide a barrier to electrically insulate components. A wide variety of conformal coating types are available, each with their own strengths and weaknesses.

Epoxy-based coatings are usually two-part systems with limited pot life. Similar to polyurethanes, they provide good moisture and chemical resistance. A major downfall is that they are almost impossible to remove chemically for rework.

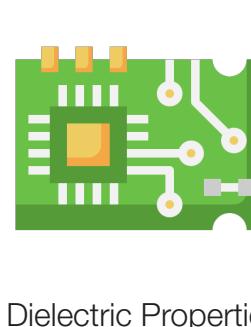
Strengths



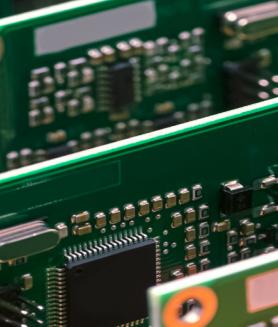
Useful to 150°C [302°F]



Harder Durometer



Abrasion Resistance



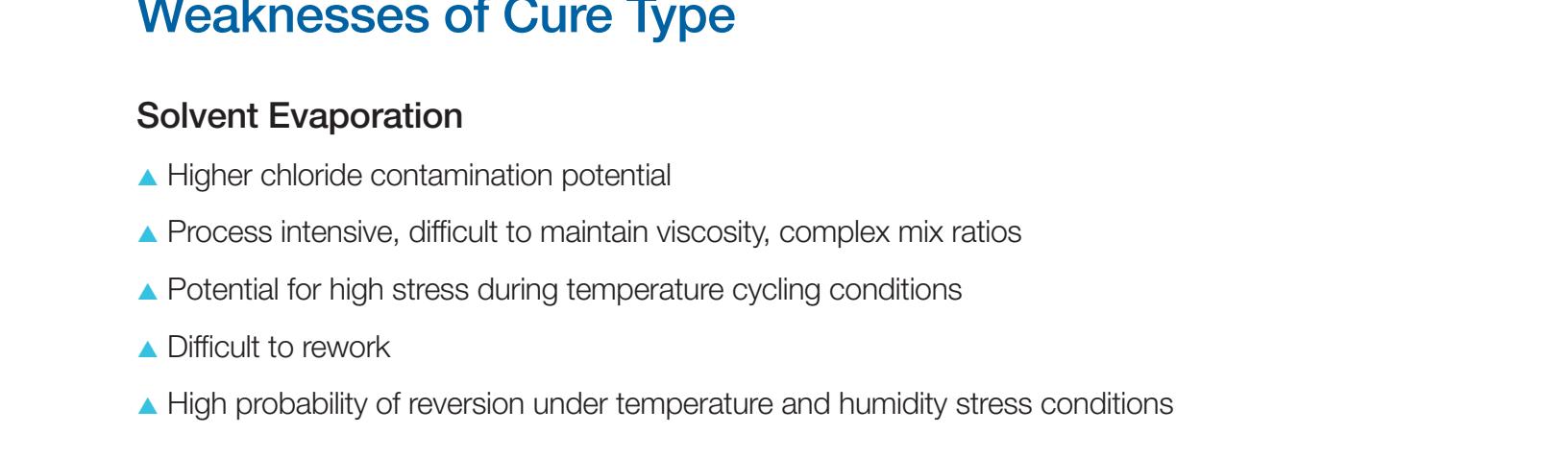
CTE Closer to Epoxy PCB Substrates



Higher Tg



Dielectric Properties



Weaknesses of Cure Type

Solvent Evaporation

- ▲ Higher chloride contamination potential
- ▲ Process intensive, difficult to maintain viscosity, complex mix ratios
- ▲ Potential for high stress during temperature cycling conditions
- ▲ Difficult to rework
- ▲ High probability of reversion under temperature and humidity stress conditions

Heat Cure

- ▲ Cure is dependent on thickness
- ▲ Component mass affects time and temperature of cure process
- ▲ Susceptible to cure inhibition
- ▲ Selective coating quality (edge definition) could be impacted
- ▲ Shrinkage (3% – 10%), potential for damaging fragile (e.g., glass) components
- ▲ Should be used with caution for low temperature components

UV Cure

- ▲ One-component coatings require accurate application material to avoid shadowed areas
- ▲ Two-part systems require meter mix equipment
- ▲ Some coatings are more difficult to rework
- ▲ UV intensity and wavelength effects cure
- ▲ Some secondary cure mechanisms require heat exposure

Catalyzed

- ▲ Cure inhibition
- ▲ Short work life
- ▲ Contamination sensitive
- ▲ Difficult to rework
- ▲ Pungent odor



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