Silicone Encapsulants versus Conformal Coatings for Printed Circuit Assemblies

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Abstract: Printed circuit assemblies are used in a wide range of automotive, aerospace, and industrial applications. The harsh environments in which these assemblies are used greatly increases the potential for electrical failures. When devices will be exposed to moist or wet conditions, high levels of debris and dust, harsh chemicals, and/or thermal stress, or when reliability is especially critical, some form of additional protection is often used with electronics.

Printed Circuit Board Protection

Conformal Coatings	
Pros	**Cons**
Ease of processing	Lowest level of protection
Speed	Protection depth
Rework	—



Encapsulants	
Pros	**Cons**
Level of protection	No rework
Thermal conductivity	Weight
Lock in components	Cost

Product	Features
DOWSIL™ 3-1953 Conformal Coating	Medium viscosity, optimal combination of stress relief and protection against harsher environmental elements
DOWSIL™ 3-1944 HP RTV Coating	High viscosity coating which allows higher- thickness coverage in critical areas; Abrasion-resistant surface after cure
DOWSIL™ 1-2577 Conformal Coating	Medium viscosity with firm, abrasion-resistant surface after cure
DOWSIL™ 1-2620 Dispersion Coating	Thinner cured coating; Greater coverage area per kg; Faster dispensing
DOWSIL™ CC-8030 Conformal Coating	Translucent, UV cure, low viscosity coating

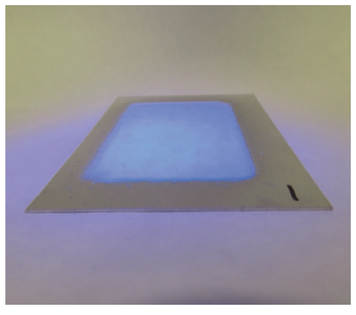
Product	Features
SYLGARD™ 160 Silicone Elastomer	Proven reliability with a higher thermal conductivity
SYLGARD™ 170 Silicone Elastomer	An industry standard with moderate thermal conductivity
DOWSIL™ 3-8264 Encapsulant	Self-priming version of SYLGARD™ 170 Elastomer
SYLGARD™ 527 Silicone Dielectric Gel	Proven industry standard with a long working time, for greater processing flexibility
DOWSIL™ 3-4207 Dielectric Tough Gel	Designed as a toughened gel for additional strength, with blue + yellow that turns to green when mixed, conditional primerless adhesion at room temperature, and a UV indicator

Multilayer Conformal Coating

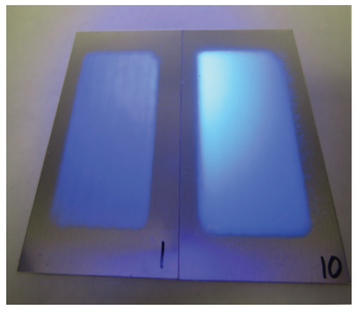
Silicone conformal coatings can be used at greater depths by using a high viscosity conformal coating, or using multiple layers of coating. This method has the processing, cost, and reworkability advantages over encapsulation.

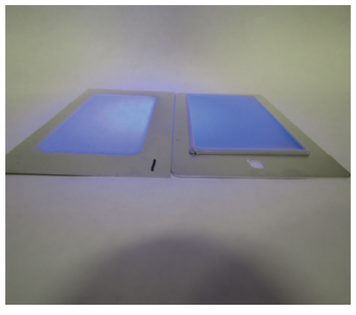
Weight / Material / Environmental Protection

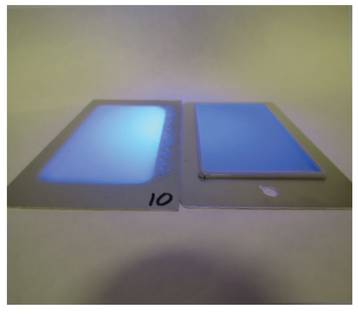
Conformal Coatings



Multilayer Conformal Coatings or Dam and Fill Products







Encapsulants

