Silicone Conformal Coating
Technical Data Sheet

5113-Liquid

Description

The 5113 *Silicone Conformal Coating* is a clear and flexible coating that is ideal for protecting electronic circuits in high temperature environments or applications requiring extreme flexibility. It protects against moisture, dirt, dust, and other particulates, and thus avoids corrosion of electronic components. It also insulates against high-voltage arcing, shorts, and static discharges. As well, it protects against thermal shock, and puts very little stress on components during temperature cycling.

The 5113 product is a low viscosity silicone, so compared to typical silicones it is easier to apply, remove, and rework. Also, it has a faster cure time, and a much longer shelf life. It is available in both aerosol and liquid forms, and may be applied by spraying, dipping, or brushing.

It performs as a 94V-0 non-flammable coating. It is intended as an easy to use cost-effective solution for protection against the typical risks PCB's face in high temperature environments.

Applications & Usages

Improve reliability and lengthen the life of electronic circuitry with 5113 . Its primary applications are in the automobile, marine, aerospace, aviation, communication, instrumentation, and industrial control equipment involving high temperatures.

Benefits and Features

- **Maximum Service Temperature of 200 °C**
- **Fast cure**—track free in 3 min at 75℃ , full cure in 48 hour at 25 °C
- **Protects electronics** from moisture, corrosion, fungus, thermal shock, and static discharges
- **Easy to inspect**: fluoresces blue at 437 nm ± 65 nm under UVA light
- **Extended Shelf Life** avoids worries about premature hardening and wastage
- **Easy rework and repairs**: Solders through the coat • removable with Cat. No. 7600 stripper.

Curing & Work Schedule

Properties	*Value*
Tack Free@25℃ @75℃	25-37 minute 3 minute
Shelf life Full Cure[a] @25°C	3 year 48 hour

a) Cure times assume a thickness of 50 μm [2 mil] and standard conditions.

Service Ranges

Properties	*Value*
Service Temperature	-100 to +200 °C
Max Coverage[b] per 1 L for 50 μm [2 mil]	<81 000 cm^2

b) Estimated based on ideal values. Actual value will be somewhat less than quoted.

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Principal Components

Name
Silicone
Epoxidized soybean oil

Properties - Cured

Physical Properties	*Method*	*Value*
Color	Visual	Clear
Solderability	—	Fair
Flexibility	—	Excellent
UV inspection absorption max	Absorption spectrum	375 nm (near UV)
fluorescence max	Emission spectrum	437 nm (blue)

Electric Properties	*Method*	*Value*
Dielectric Strength at 0.0150 inches	IPC-TM-650 Test 2.5.6.1	456 V/mil
Volume Resistivity @23 °C 50% RH	ASTM D 257-07	1.7×10^{17} Ω·cm
Surface Resistivity	"	9.2×10^{15} Ω/sq
Dielectric Constant @60 Hz & 25 °C	ASTM D 150-98	2.35
Dielectric Constant @1 MHz & 25 °C	"	2.18
Dissipation Factor @60 Hz & 25 °C	"	0.0037
@1 MHz & 25 °C	ASTM D 150-98	0.00012

Thermal Properties	*Method*	*Value*
Coefficient of Thermal Expansion	IPC-TM-650 Test 2.4.24	253.3 ppm/°C
Glass Transition Temperature	"	none detected
Softening Point	"	121.4 °C

Environmental & Ageing Study	*Method*	*Value*
Salt Spray Test: 7 day @35 °C +Salt/Fog	ASTM B117-2011	
Cross-hatch adhesion	ASTM D3359-2009	5B = 12%area removed
Cracking, unwashed area	ASTM D661-93	None
Visual Color, unwashed area	ASTM D1729-96	No change
Peeling, unwashed area	ASTM D1729-96	None

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Properties - Uncured

Physical Property	*Method*	*Value*
Odor	—	Mild
Viscosity at 25°C	Brookfield SP1	130 cP
Density		0.90 g/mL
Solids Content (w/w)		75% (liquid)

Compatibility with Substrate

The 5113 silicone is compatible with most materials found on printed circuit assemblies; But, it is extremely important to clean the printed circuit assembly thoroughly with a suitable electronic cleaner before applying the coating.

The chosen electronic cleaner should remove moisture, wax, greases, oils, and all other contaminants that are known to cause defects in this type of conformal coating.)

Health, Safety, and Environmental Awareness

Please see the 5113 **Material Safety Data Sheet** (MSDS) for more details on transportation, storage, handling and other security guidelines.

Environmental Impact: The 5113 formulation is free from ozone depletion compounds.

Health and Safety: The liquid is flammable and should be kept away from flames and other ignition sources. As with most paint materials, avoid breathing in fumes or direct contact with the material.

Wear disposable nitrile gloves for short contact (<8 hours). For extended contact use viton gloves. Wash hands thoroughly after use. Use in the open air, in fume hoods, or in well ventilated area.

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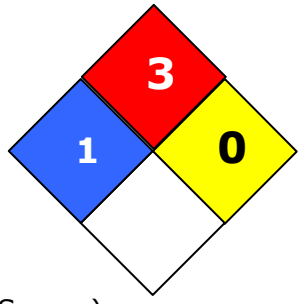
HMIS® RATING

HEALTH:	**1**
FLAMMABILITY:	**3**
PHYSICAL HAZARD:	**0**
PERSONAL PROTECTION:	

NFPA® 704 CODES



Approximate HMIS and NFPA Risk Ratings Legend:
0 (Low or none); 1 (Slight); 2 (Moderate); 3 (Serious); 4 (Severe)

Spray Gun Application Instructions

Read the procedure below and make necessary adjustments according to your spray gun equipment usage instructions. Each coat results in a dry film thickness of roughly 2 mil [50 μm].

ATTENTION! Besttec Chemical recommends a dry film thickness of 35 to 98 μm . Since it is a solvent-based and low viscosity silicone system, the thickness upper limit is below 200 μm [8 mil].

To apply the required thickness by weight

1. Mix thoroughly, and spray a test pattern.
   This step ensures good flow quality and helps establish appropriate distance to avoid runs.
2. At a distance of 20 to 25 cm (8 to 10 inches), hold the gun at around 45°, and spray a thin and even coat onto the horizontal board. For best results, use spray-and-release strokes with an even motion to avoid excess paint in one spot.
3. Before the next coat, rotate the board 90° to ensure good coverage.
4. Wait at least 15 minutes, and spray another coat. The delay avoids trapping solvent between coats.
5. Apply other coats until desired thickness is achieved. (Go to Step 3)
6. Let dry for 30minutes at room temperature.

To cure the conformal coating

Full cur can be achieved in 20 minutes or less by using an infrared lamp or in convection oven at 75 °C.
At room temperature, the coat dries to the touch in 30 minutes. And full cure takes about 48 hours.
The procedure above is based on a minimum thickness of 50μm (2mil) conformal coating. After full cure, measure the actual conformal coating thickness to ensure it meets the applications requirements.

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Packaging and Supporting Products

Cat. No.	*Form*	*Net Volume*		*Net Weight*		*Shipping Weight*	
5113-1L	Liquid	950 mL	1 qt	0.9 kg	1.9 lb	5.5 kg	11.5 lb (×5) [b)]
5113-4L	Liquid	3.8 L	1 gal	3.4 kg	7.6 lb	3.8 kg	8.3 lb
5113-20L	Liquid	19 L	5 gal	17.1 kg	37.7 lb	19 kg	42 lb
Contact Besttec Chemicals if custom packaging or sizes are required							

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Technical Support

Contact us regarding any questions, improvement suggestions, or problems with this product. Application notes, instructions are located at www.besttec.us .

Email: support@besttec.us

Warranty

Besttec Chemical Ltd. warranties this product for 12 months.
Besttec Chemical Ltd. makes no claims as to shelf life of this product for the warranty. The liability of *Besttec Chemical Ltd.* whether based on its warranty, contracts, or otherwise shall in no case include incidental or consequential damage.

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