by

SVP 52
Silicon Conformal Coating

FEATURES

SVP 52 is a flexible, transparent silicone conformal coating designed to protect printed circuit boards, meeting the highest Defense and Aerospace industry requirements. For example, it is commonly used to protect radar and telecom devices exposed to extreme environmental conditions.

SVP 52 is resistant to most solvents, lubricants and cooling fluids.

Fluorescent under UV light as an aid for inspection.

TYPICAL PROPERTIES

Properties LIQUID	SVP 52 Conformal Coating
Nature	silicone
Colour	Clear pale amber
Non-volatile %	35 aprox (bulk)
Flash Point	25°C
Viscosity @ 20°C	120 – 160 cSt (bulk)
Specific Gravity @ 20°C	0.97

Properties CURED	SVP 52 Conformal Coating
Dielectric Strength	90 KV/ mm
Electrical resistivity	1×10^{15} Ω/ cm
Temperature range	-60°C to 200°C
Flammability	Self-extinguishing
Dissipation factor @ 1MHz, 25°C	0.01
Isolation Resistance per MIL-I-46058C	1×10^{12} Ω
Rapid Temperature Variation test (-25° to 25° C, 100 cycles, 15 min plateau, 5°C/min)	pass
Thermal Shock (15 min @ -25°C to 15 min @ 50°C/ 50 cycles)	pass

Properties CURED (continue)	SVP 52 Conformal Coating
Dielectric withstanding Voltage per MIL-I-46058C	> 1500 V
SIR test (15 Hr/ 20° to 80°C / 90% RH)	pass
Moisture Resistance (10° to 80° C/ 95% RH/ 90 days)	pass
Salt fog (NF X41-002). Salt solution 5%	600 hrs

CHARACTERISTICS

- Excellent adhesion under all climatic conditions
- Resistant to most solvents, lubricants and cooling fluids.
- Excellent resistance to mould growth and UV light.
- Provides protection during extended exposure to tropical and salted environmental conditions.
- Wide temperature range -60°C to 200°C.
- High gloss finish and high surface resistivity.
- Coating thickness typically being 25 to 50 micron.
- Fluorescent under ultra violet light as an aid to subsequent inspection.
- Can be soldered through without fear of highly toxic gases being produced.

Properties	SVP 52 Conformal Coating
Removable	No
Solder-through repairability	Yes
Solvent and chemical resistance	Yes
Nature	Silicone
Shelf life	12 months, when stored in the original, unopened container
Application options	Dipping, spray, brushing, compatible with a large range of dispensing equipments
Recommended coating thickness	25 – 50 microns

APPLICATION

SVP 52 Conformal Coating can be sprayed, dipped or brushed. The thickness of the coating depends on the method of application. Workshop temperatures of less than 16°C or RH above 75% are unsuitable for the application of SVP 52.

Pre-drying or better still, vacuum desiccation of the PCB will remove most of the moisture to assure best conformal coating protection

It contains a UV trace which allows inspection of the PCB after coating to ensure a complete and even coverage. The stronger the reflected light, the thicker the coating layer is.

Before coating, PCBs must be clean, dry and without moisture. The PCB being humidity sensor, it is important to remove it before coating. A pass in oven for 1 to 2 hours at 80 ° C is generally sufficient.

Cleaning

Boards should be thoroughly cleaned before coating. This is required to ensure that satisfactory adhesion of the coating to the substrate is achieved. Solder paste flux residues must also be removed as they may become corrosive when left on the PCBA.

In past years there have been major improvements in flux residues reliability and their compatibility with conformal coating. This improvement in electrochemical corrosion has been achieved using the Bono corrosion test as key technique to assure the chemical residue of the flux is chemically inert after soldering providing a reliable adhesion. This is a key reliability advantage for no-clean processes using conformal coating. Inventec offer ECOREL™ solder pastes compliant with Bono corrosion test and all SIR industry standards.

To clean equipments **SVP 52 Conformal Coating** not cured, it is recommended the cleaning solvent SND.

Dip Coating application

Ensure that the coating material in the container has been agitated thoroughly and has been allowed to stand for at least 2 hours for all the air bubbles to disperse.

SVP 52 Thinners (DVS) should be used to keep the coating at a suitable viscosity for dipping. DVS is added periodically as the solvent evaporates. The viscosity should be checked using a viscosity meter or "flow cup". The board assemblies should be immersed in the **SVP 52** coating dipping tank in the vertical position, or at an angle as close to the vertical as possible. Connectors should not be immersed in the liquid unless they are very carefully masked.
Leave submerged for about 1 minute until the air bubbles have dispersed. The board or boards should then be withdrawing very slowly (10 to 20 cm/mn) so that an even film covers the surface.

After the draining step is completed, the boards should be placed in an air-circulating drying cabinet and left to dry for 2 hours at room temperature before any heat curing process.

Spray application

Bulk **SVP 52** needs to be thinned with SVP 52 Thinners (DVS) before spraying. The optimum viscosity to give coating quality and thickness depends on the spray equipment and conditions but a starting point could be 2 parts coating to 1 part thinner. If bulk coating material has been agitated, allow to stand until air bubbles have dispersed.

SVP 52 is suitable both for use in manual spray guns and computer controlled airless spray equipment that only coats the required areas of the PCB, eliminating the need for masking. The nozzle of the spray gun requires to be selected to give an even spray to suit the viscosity of the coating material.

To ensure penetration of the coating beneath the components and in confined spaces, spray the assembly from all directions to give an even coating. After spraying, the boards should be placed in an air-circulating drying cabinet and left to dry for 2 hours at room temperature prior to any heat curing.

Brushing application

Ensure that the coating material has been agitated thoroughly and has been allowed to settle for at least 2 hours. The coating should be kept at ambient temperature. Gently apply the coating with a good quality brush avoiding leaving brush marks in order that the components and wiring are not affected. After brushing, the boards should be placed in an air-circulating drying cabinet and left to dry for 2 hours at room temperature prior to any heat curing.

Dry Times and Curing Conditions

The properties obtained from **SVP52** are dependent on the curing steps applied. It is essential that the coating is allowed a minimum of 2 hours drying time at ambient temperature prior to any heat curing (step 1). This is necessary to allow the solvent system to evaporate.

A gain in performance from this coating can be reached by curing for additional two hours at 90°C after the two hour room temperature cure (step 2). This will give limited resistance to solvents such as 113 trichlorotrifluoroethane (CFC-113)

If the PCBA is designed to be used under hazardous conditions of high temperature or be exposed to extremes of thermal cycling, the coating should be cured for 12 hours at ambient followed by 24 hours at 90°C (step 3). This curing step will give resistance to more aggressive solvents such as 1.1.1 trichloroethane (methyl chloroform)

STEP 1	STEP 2 – Performance gain	STEP 3 – under hazardous conditions
2 Hours at room temperature	2 Hrs room temperature plus 2 hrs at 90°C	12 Hrs room temperature plus 24 hrs at 90°C

It is recommended that the coating be thoroughly cured on circuits which have designed areas of very high impedance which may require adjustment after application.

Double coating

Two coats of SVP52 are not usually needed if the curing steps are followed. However if two coats are required, the second coating should be applied within 15 minutes of the first. This will ensure that the two coats will bond satisfactorily.

Plastic Compatibility

Please note the solvent system for this product contains Xylene which could possibly affect polystyrene and polycarbonates plastics

PACKAGING

SVP 52
5 l Bottle container
or 400 ml Aerosol bottle (100% ozone friendly)

Silicon Thinner DVS
5 l Bottle container

STORAGE

Twelve months from date of manufacture in unopened original container and stored under conditions of 5° to 35°C

HSE

Before using this product, please read the current product material safety data sheet (available through your sales or technical service representative) and the precautionary statement on the product package. Follow all applicable precautions and directions.

This data is based on information that the manufacturer believe to be reliable and offered in good faith. In no event will INVENTEC be responsible for special, incidental and consequential damages. The user is responsible to the Administrative Authorities (regulations for the protection of the Environment) for the conformity of his installation.

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