



# Technical Data Sheet

<b>PRODUCT DESCRIPTION:</b>	<b>SCC3 Conformal Coating</b>	<b>DATE:</b>	<b>03/97</b>
<b>PRODUCT CODE:</b>	<b>DCA and DCE</b>	<b>PAGES:</b>	<b>4</b>

## PRODUCT DESCRIPTION

**SCC3** is a flexible, transparent modified silicone resin conformal coating. It is designed to meet the highest defence standards in both Europe and the United States. It holds approvals including the British Ministry of Defence (MOD) DEF-STAN 59/47 Issue 4, and Underwriters Laboratories (UL) QMJU2.

**SCC3** is designed to be resistant to common solvents and can only be removed with a specific gel. It may be soldered through to allow rework.

It is suitable for dip coating, spraying and brushing, and has a family of associated products such as a removing gel (**DRG**) and gel thickened version (**DCE**). All of these products are 100% Ozone Friendly. **SCC3** is also available in 100% Ozone Friendly aerosol form.

Coloured versions of **SCC3** also exist, although they do not have the same approvals. These are used to camouflage the PCB to make copying designs impossible. **Black (DCB)** and **Red (DCR)** versions are available.

## PRODUCT USE

**SCC3** is for use in the protection of electronic circuitry to meet the highest defence and aerospace industry requirements. Common uses include in telecommunications, radar and associated applications.

## FEATURES

- \* Approved to UK defence standards DEF STAN 59/47 issue 4.
- \* UL approval for use on recognised printed wiring boards QMJU2 - approval E138403 (R)
- \* Excellent adhesion under all climatic conditions including high altitude/decompression to BS.3G100, MIL-STD-810C, RTCA D0160A, ARINC 600.
- \* Resistant to most solvents, lubricants and cooling fluids.
- \* Excellent resistance to mould growth and ultra violet light, and to prolonged exposure to tropical life and salt spray.
- \* Wide temperature range -70°C to 200°C.
- \* High gloss finish and high surface resistivity.
- \* Good dielectric properties at all frequencies to DEF-STAN 59-4/2 Annex C, coating thickness typically being 25 to 50 micron.
- \* Fluorescent under ultra violet light as an aid to subsequent inspection.

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- \* Can be soldered through without fear of highly toxic gases being produced, e.g. isocyanates.
- \* Non-corrosive to Cadmium and Zinc plate (contains no Phenol).
- \* A thixotropic version, **Silicone Elastomer Gel (DCE)** is available for component support under vibration/shock and localised encapsulation for high impedance/high voltage circuitry.

### APPLICATION

**SCC3** can be sprayed, dipped or brushed. The thickness of the coating depends on the method of application, but a dip coater normally deposits a film thickness of about 25 microns (single coat). Workshop temperatures of less than 16°C or relative humidities in excess of 75% are unsuitable for the application of **SCC3**. All PCBs, being composite materials, absorb moisture. If this is not removed, the conformal coating may not protect to its fullest extent. Pre-drying, or better still, vacuum desiccation, will remove most of the moisture.

**SCC3** contains a UV trace which allows inspection of the PCB after coating to ensure complete and even coverage. The stronger the reflected light, the thicker the coating layer is.

### Cleaning

Boards should be thoroughly cleaned before coating. This is required to ensure that satisfactory adhesion to the substrate is possible. Also all flux residues must be removed as they become corrosive if left on the PCB. **Electrolube** manufacture a range of 100% Ozone Friendly cleaning products in both the hydrocarbon solvent and aqueous fields. All products produce results within the Military specification. Please contact **Electrolube** for further information.

### Dip Coating

**Electrolube** manufacture an automated **Dip Coating Machine (DCM)** which is ideal for applying all of the **Electrolube Conformal Coatings** including **SCC3**.

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.

**SCC3 Thinners (DCT)** should be used to keep the **SCC3** coating at a suitable viscosity for dipping. **DCT** 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 **SCC3** 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. **Electrolube Peelable Coating Mask (PCM)** is ideal for this application.

Leave submerged for about 1 minute until the air bubbles have dispersed. The board or boards should then be withdrawn VERY SLOWLY so that an even film covers the surface. After withdrawing, the boards should be left to drain over the tank until the majority of residual coating has left the surface.

After the draining operation is complete, 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.

### Spraying

Bulk **SCC3** needs to be thinned with **SCC3 Thinners (DCT)** 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 thinners. If bulk coating material has been agitated, allow to stand until air bubbles have dispersed.

**DCA** 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 prevailing viscosity of the coating material. The normal spray gun pressure required is  $27.6 \times 10^6$  kN/m<sup>2</sup> to  $34.5 \times 10^6$  kN/m<sup>2</sup> (40 - 50 lbs/sq.inch)

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**

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 so as not to leave brush marks and so that the components and wiring are not disturbed.

When the brushing operation is complete 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.

### **Drying Times and Curing Conditions**

The properties gained from **SCC3** are dependent on the curing schedule employed. It is essential that the coating is allowed a minimum of two hours drying time at ambient temperature prior to any heat curing. This is necessary to allow the solvent system to evaporate.

#### **Commercial**

Most commercial users will gain satisfactory performance from this coating by curing for two hours at 90°C after the two hour ambient cure. This will give limited resistance to solvents such as 113 trichlorotrifluoroethane.

#### **Military**

If the assemblies are 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. This curing schedule will give resistance to more aggressive solvents such as 1.1.1 trichloroethane.

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

### **Double Coating**

Two coats of **SCC3** are not usually required if the curing schedule is 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.

## Applying Silicone Elastomer Gel (DCE)

The most convenient method of applying **DCE** is through a syringe to form a fillet around the component(s). Similarly through a syringe for local encapsulation over high impedance / high voltage points. The **Silicone Elastomer Gel** is prepared from **SCC3** and so has the same electrical properties. As **DCE** is thixotropic in nature it requires a minimum 4 hours room temperature drying time to ensure complete evaporation of solvent. In thick film it may also require a longer time at high temperature for a full cure. An acceptable cure for military usage is 24 hours at ambient followed by 24 hours at 90°C.

## Repairability

Local areas of cured **SCC3** can be removed using **SCC3 Remover Gel**. Alternatively, the coating can be removed using air-abrasive equipment e.g. S.S. White 'Abrasive', available from GEC Mechanical Handling Limited. Particulate sodium bicarbonate has been found suitable as an abrasive material.

## TYPICAL PROPERTIES

### **Liquid SCC3**

Colour:	Clear Pale Straw
Non-volatile Content:	37% approx (bulk material)
Viscosity @ 20°C:	165 - 215 cps (bulk material)
(Brookfield LVF: spindle 2 @ 60rpm)	
Specific Gravity @ 20°C:	0.97(bulk), 0.78(aerosol)
Flash Point:	27°C (Xylene)(bulk), 0°C(aerosol)
Coverage (for 200ml Aerosol):	8000cm <sup>2</sup> @ 25 microns approx

### **Cured SCC3 Coating**

Dielectric Strength:	90kV/mm
Electrical Resistivity:	1 x 10 <sup>15</sup> Ohms/cm
Hardness:	265 seconds
Perzos:	60 seconds
Sward:	Self-extinguishing
Flammability:	-70°C to +200°C
Temperature Range:	

## PACKAGING

## ORDER CODE

### SCC3 Conformal Coating

200ml Aerosol	DCA200H
1 Litre Bulk	DCA01L
5 Litre Bulk	DCA05L

### Silicone Elastomer Gel

1 Litre Bulk	DCE01L
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### SCC3 Remover Gel

1 Litre Bulk	DRG01L
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### SCC3 Thinners

5 Litre Bulk	DCT05L
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### Nato Stock No (DCA200H)

6850-99-253-0057

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