



# Technical Data Sheet

## DCA Modified Silicone Conformal Coating (SCC3)

### Product Description

DCA is a flexible, transparent & unique modified silicone conformal coating specifically designed for the protection of electronic circuitry. It has been formulated 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 UL746CQMJU2.

### Features

- Resistant to most solvents, lubricants and chemicals associated with most aerospace and automotive applications.
- Excellent adhesion under all climatic conditions to a variety of substrates, including high altitude/decompression to BS.3G100, MIL-STD-810C, RTCA D0160A, ARINC600.
- Fluoresces under UV light for ease of inspection.
- Extreme operating temperature range.
- Can be soldered through without fear of highly toxic gases being produced (contains no isocyanates).
- Non-corrosive to Cadmium and Zinc plate (contains no phenols).
- Excellent resistance to mould growth & UV light
- Cured coating can be removed with Electrolube SCC3 Remover Gel (DRG).
- Excellent dielectric properties at all frequencies in accordance to DEF-STAN 59-4/2 Annex C

### **Approvals**

**UL746CQMJU2**  
**DEF-STAN 59/47 (Issue 4)**  
**RoHS Compliant (2002/95/EC):**  
**IPC-CC-830**  
**NATO Stock Numbers:**

**Yes Approval E138403 (R)**  
**Yes**  
**Yes**  
**Meets approval**  
**6850996642823 (DCA05L)**  
**6850992530057 (DCA200H)**

### **Liquid Properties**

Appearance:  
Specific Gravity (Density) @ 20°C:  
VOC Content:  
Flash Point:  
Solids content:  
Viscosity @ 20°C:  
Touch Dry:  
Recommended Curing Schedule:

Clear Pale Straw  
0.97 (Bulk), 0.78 (Aerosol) g/ml  
73% (Bulk) 83% (Aerosol)  
27°C (Bulk), <23°C (Aerosol)  
37% (Bulk), 27% (Aerosol)  
180 - 250 Centipoise (Bulk)  
50 - 55 minutes  
2 Hours @ 20°C Followed by:  
2 - 24 Hours @ 90°C to 120°C  
(Maximum Solvent Resistance Achieved @ 120°C)  
14.8 m<sup>2</sup> per litre (Bulk), 2.16 m<sup>2</sup> (200ml Aerosol)

Coverage @ 25 µm:

**Cured Film Coating:** Colour: Colourless  
 Operating Temperature Range: -70°C to +200°C  
 Flammability: Self-extinguishing (UL94)  
 Thermal Cycling: Meets MIL 1-46058C approval  
 Coefficient of Expansion: 90ppm  
 Dielectric Strength: 90 kV/mm  
 Dielectric Constant: 3.95 @ 1 MHz  
 Insulation Resistance:  $1 \times 10^{15}$  Ohms/cm (DEF-STAN 59/47)  
 Dissipation Factor: 0.037 @1 MHz 25°C  
 Moisture Resistance (MIL-1-46058C): Meets approval

<u>Packing</u>	<u>Description</u>	<u>Order Code</u>	<u>Shelf Life</u>
<u>DCA Conformal Coating</u>	200ml Aerosol	DCA200ML	36 Months
	1 Litre Bulk	DCA01L	48 Months
	5 Litre Bulk	DCA05L	48 Months
<u>Thinners</u>	1 Litre	DCT01L	36 Months
	5 Litre Bulk	DCT05L	36 Months
<u>Remover</u>	1 Litre Bulk	DRG01L	36 Months

**The complete SCC3 Range in Brief**

	Clear	Red Opaque	Black Opaque	Thixotropic	High Viscosity	200ml Aerosol	1 Litre Bulk	5 Litre Bulk
<b>DCA *</b>	✓					✓	✓	✓
<b>DCB *</b>			✓				✓	✓
<b>DCR *</b>		✓				✓	✓	✓
<b>DCE *</b>	✓			✓			✓	
<b>DCRT *</b>		✓			✓			✓
<b>DCT (Thinners)</b>							✓	✓
<b>DRG (Remover)</b>							✓	

\* Approvals may vary, please consult the relevant data sheet for full information.

## Directions For Use

DCA can be sprayed, dipped or brushed. The thickness of the coating depends on the method of application (typically 25 microns). Temperatures of less than 16°C or relative humidity in excess of 75% are unsuitable for the application of DCA. As is the case for all solvent based conformal coatings, adequate extraction should be used (refer to MSDS for further information).

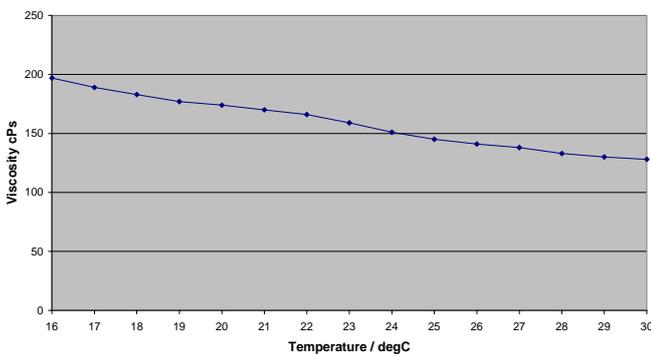
Substrates should be thoroughly cleaned before coating. This is required to ensure that satisfactory adhesion to the substrate is achieved. Also, all flux residues must be removed as they may become corrosive if left on the PCB. Electrolube manufacture a range of cleaning products using both hydrocarbon solvent and aqueous technology. Electrolube cleaning products produce results within Military specification.

## Spraying – Bulk

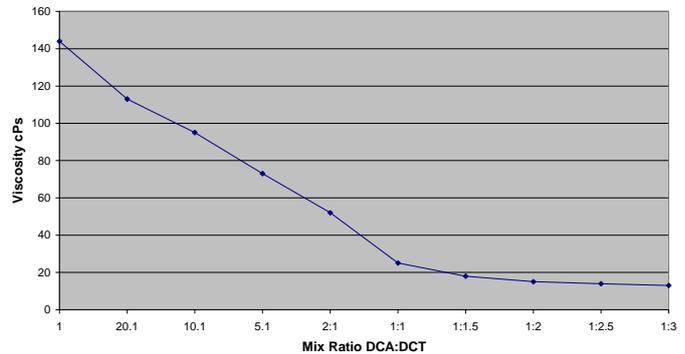
DCA needs to be diluted with the appropriate thinners (DCT) before spraying. The optimum viscosity to give coating quality and thickness depends on the spray equipment and conditions, but normally a dilution ratio of 2:1 (DCA to DCT) is required. Suitable spray viscosity is typically 50-80 centipoise. 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 selective coating equipment.

The selected nozzle should enable a suitable even spray to be applied in addition to suiting the prevailing viscosity. The normal spray gun pressure required is 274 to 413 kPa (40 - 60 lbs/sq.inch). After spraying, the boards should be placed in an air-circulating drying cabinet following the curing schedule highlighted on page 4.

Viscosity Change with Temperature - DCA



Viscosity Chart DCA:DCT



## Spraying - Aerosol

When applying DCA in aerosol form care must be taken to ensure the can is not shaken before use. Shaking the can will introduce excessive air bubbles and will give a poor coating finish.

The can should be held at 45°, and 200mm from the substrate to be coated. The valve should then be depressed when the can is pointing slightly off target and moved at about 100mm / second across the target. To ensure the best coating results are achieved try to use a smooth sweeping motion with small overlap for successive rows.

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 following the curing schedule highlighted on page 4.

## **Dip Coating**

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 DCA coating at a suitable viscosity for dipping (180 – 250cPs @ 20°C). 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 DCA 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 approximately 10 seconds until the air bubbles have dispersed. The board or boards should then be withdrawn slowly (1 to 2 Seconds / mm) so that an even film covers the surface. After withdrawing, the boards should be left to drain over the tank or drip tray 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 following the curing schedule (shown below).

## **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.

When the brushing operation is complete, the boards should be placed in an air-circulating drying cabinet following the curing schedule (shown below).

## **Drying Times and Curing Conditions**

The properties gained from DCA are dependent on the curing schedule employed. It is essential that the coating be 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.

**Military** If the assemblies are to be used under 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. For maximum solvent resistance cure at 2 hours at ambient following by 24 hours @ 120°C. This curing schedule will give resistance to the more aggressive solvents.

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

## **Inspection**

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

### **Copyright Electrolube 2005**

All information is given in good faith but without warranty. Properties are given as a guide only and should not be taken as a specification.

Electrolube cannot be held responsible for the performance of its products within any application determined by the customer, who must satisfy themselves as to the suitability of the product.