ELECTROLUBE
THE SOLUTIONS PEOPLE

DCA
Modified Alkyd Conformal Coating (SCC3)

DCA is a flexible, transparent and unique modified alkyd 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 UL746E-QMJU2.

- Can be cured at ambient or elevated temperatures; optimum properties achieved by heat curing
- Heat-cured coating is resistant to many solvents used within aerospace and automotive industries
- Suitable for use at temperature extremes; very wide operating temperature range
- Can be reworked using specialist removal product, Electrolube CCRG

Approvals	**RoHS Compliant (2015/863/EU):**	**Yes**
	UL746E-QMJU2:	**Approved File Number: E138403**
	DEF-STAN 59/47 (Issue 4):	**Yes**
	IPC-CC-830:	**Meets approval**
	NATO Stock Numbers:	**6850996642823 (DCA05L)** **6850992530057 (DCA200H)**
Liquid Properties	Appearance:	Clear Straw/Amber
	Density @ 20°C (g/ml):	0.97 (Bulk), 0.78 (Aerosol)
	VOC Content:	63% (Bulk) 73% (Aerosol)
	Flash Point:	27°C (Bulk), <23°C (Aerosol)
	Solids content:	37% (Bulk), 27% (Aerosol)
	Viscosity @ 20°C (mPa s):	180 - 250 (Bulk)
	Touch Dry:	50 - 55 minutes
	Recommended Curing Schedule*:	2 Hours @ 20°C followed by: 2 - 24 Hours @ 90°C to 120°C
	*(Maximum Solvent Resistance Achieved @ 120°C; Ambient Curing Schedule: 24 Hours @ 20-25°C)	
	Coverage @ 25 µm:	14.8m² per litre (Bulk), 2.16m² (200ml Aerosol)
Cured Film Coating	Colour:	Colourless
	Operating Temperature Range:	-70°C to +200°C
	Flammability:	UL94 V-1
	Thermal Cycling (IPC-CC-830):	Meets approval
	Coefficient of Expansion:	90ppm
	Dielectric Strength:	90 kV/mm
	Dielectric Constant:	3.95 @ 1 MHz
	Insulation Resistance:	1 x 10^{15} Ohm (DEF-STAN 59/47)
	Dissipation Factor (@1 MHz, 25°C):	0.037
	Moisture Resistance (IPC-CC-830):	Meets approval

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Description	Packaging	Order Code	Shelf Life
DCA Conformal Coating	200ml Aerosol	DCA200ML	36 Months
	1 Litre Bulk	DCA01L	48 Months
	5 Litre Bulk	DCA05L	48 Months
Conformal Coating Thinners	1 Litre	DCT01L	36 Months
	5 Litre Bulk	DCT05L	36 Months
Conformal Coating Removal Gel	1 Litre Bulk	CCRG01L	36 Months

Directions for Use

DCA can be sprayed, dipped or brushed. The thickness of the coating depends on the method of application (typically 25-75 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

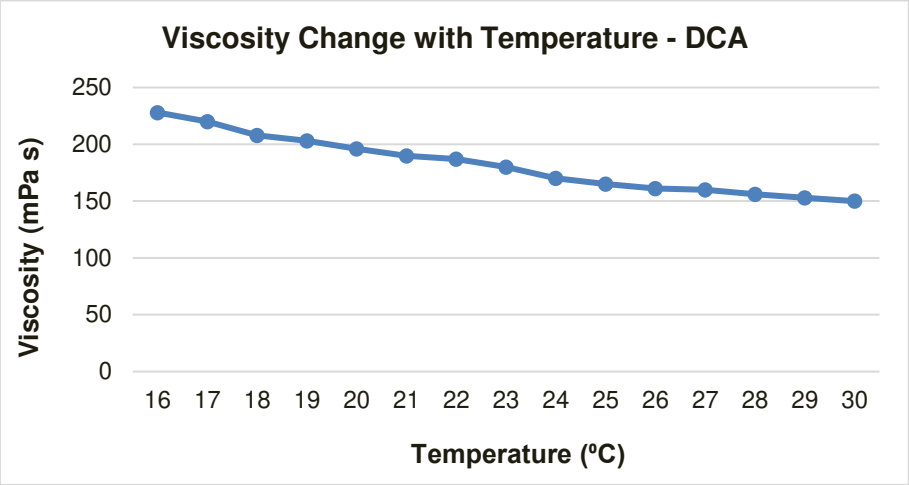
DCA needs to be diluted with the appropriate thinners (DCT) before spraying. The optimum viscosity to give coating quality and thickness depends on the spray equipment and conditions, but normally a dilution ratio of 2:1 (DCA:DCT) is required. Suitable spray viscosity is typically 50-80mPa s. If bulk 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 4/5.

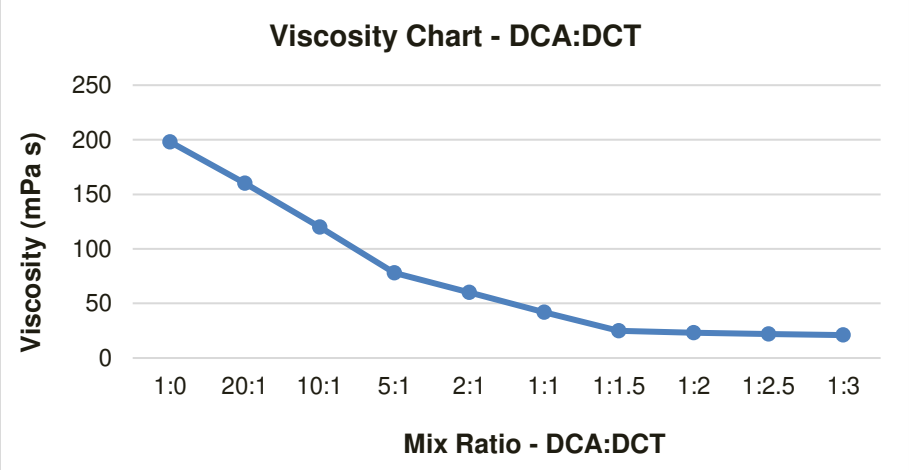
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Spraying - Aerosol

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/s across the target. To ensure the best coating results are achieved try to use a smooth sweeping motion with small overlap for successive rows.

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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 4/5.

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.

Conformal Coating Thinners (DCT) should be used to keep the DCA coating at a suitable viscosity for dipping (180 – 250mPa s @ 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 Masks (PCM/PCS) are 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 2s/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.

Ambient Ambient curing is via solvent evaporation only. Eliminating the heat curing step will reduce solvent resistance. Other properties, such as resistance to humid and corrosive environments, may also reduce but still meet the requirements of many industry standards. Coated boards should be left at room temperature for the solvent to evaporate; extraction is required in the curing area.

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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. UV light in the region of 375nm should be used for inspection.

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