

## UVCL UV Cure Conformal Coating

UVCL is a low viscosity, single-part conformal coating, which cures rapidly on exposure to the correct dose of UV light. UVCL has a highly effective, moisture initiated secondary cure mechanism to ensure curing in shadowed areas. It has been specifically designed to offer the highest level of protection for electronic circuitry at high production throughputs. UVCL has been designed for application via selective spray equipment and demonstrates ease of automation, along with excellent storage stability and shelf-life.

- Dual cure system; secondary moisture cure for full cure, even in shadow areas
- Eliminates the use of solvents; VOC-free and non-flammable coating
- No dilution required; low viscosity, ready to use for selective spray application
- Ultimate protection in harsh environments, including high humidity, corrosive and chemical atmospheres

<b>Approvals</b>	<b>RoHS Compliant (2015/863/EU):</b> <b>IPC-CC-830:</b> <b>IEC-61086:</b> <b>UL746-QMJU2:</b>	<b>Yes</b> <b>Meets Requirements</b> <b>Meets Requirements</b> <b>Approved: File Number E138403</b>
<b>Liquid Properties</b>	Appearance: Base material: Density @ 20°C (g/ml): Solids Content: VOC content: Flash Point: Viscosity @ 25°C (mPa s): Coverage @ 100µm:	Pale Yellow Liquid Urethane acrylate 1.1 100% 0% >90°C 225 - 400 10m <sup>2</sup> /litre
<b>Dry Film Coating</b>	Colour: Operating Temperature Range: Surface Insulation Resistance: Dielectric Strength: Dielectric Constant @ 1MHz: Dissipation Factor @ 1MHz, 25°C: Flammability: Moisture Resistance (IPC-CC-830): Thermal Shock: IPC-CC-830 (-65°C to +125°C): Additional (-40°C to +125°C): Glass Transition Temperature (DMA) Tensile Strength (BS EN ISO 537) Elastic Modulus (BS EN ISO 537)	Colourless -65°C to +135°C 1 x 10 <sup>15</sup> Ω 27 kV/mm 2.5 0.01 UL94 V-0 7 x 10 <sup>12</sup> Ω Pass 100 Cycles Pass >1000 Cycles 7°C 2.7 MPa @ 20°C 2940 MPa @ -40°C 2.2 MPa @ 25°C 2.2 MPa @ 130°C 100%
	Elongation at Break (BS EN ISO 537)	100%

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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.

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BS EN ISO 9001:2008  
Certificate No. FM 32082

<u>Packaging*</u>	<u>Description</u>	<u>Order Code</u>	<u>Shelf Life</u>
UVCL UV Cure Coating	4 Litre Bulk	EUVCL04LE	12 Months
Industrial Machine Cleaner	5 Litre Bulk	IMC05L	36 months

\*Other packaging sizes may be available upon request.

### **Directions for Use**

Substrates should be thoroughly cleaned before coating to ensure satisfactory adhesion to the substrate. All flux residues should be removed as they may become corrosive or interfere with adhesion if left on the PCB. Electrolube manufacture a range of cleaning products using both hydrocarbon solvent and aqueous technology.

UVCL has been specifically designed for automated processes using selective spray technology however other spraying techniques and touch-up application via brush may also be employed. The coating application must be done away from the UV light source to prevent premature curing.

### **Spraying – Bulk**

UVCL is supplied at a viscosity suitable for selective spraying. Due to the secondary moisture curing capability of the product, it is advised that all storage tanks are kept sealed to protect from moisture, thereby ensuring product quality. Fluid transfer lines, nozzles and applicator heads should all be immersed in Industrial Machine Cleaner (IMC) when not in use.

A range of application thicknesses are possible with UVCL, depending on the spray equipment and parameters employed. Suitable coating thickness should be determined by the user, for each application, ensuring the required levels of protection for the PCB are met. However, typical thicknesses of 100-200um are regularly used within the industry, providing high levels of resistance to moisture, chemicals and debris, whilst possessing a good balance between surface hardness and bulk flexibility.

### **Brushing**

As it is a manual process with many variables, brush coating is only advised for touch-up applications. Brushes should be clean and dry prior to use and exposure to UV light minimised to avoid premature curing.

### **Curing**

The speed of UV cure depends on a number of factors, namely the wavelength, the intensity and the dosage of UV light used for curing, the applied coating thickness and the height of the components on the PCB. Once UVCL has been exposed to the recommended UV curing regime (detailed overleaf), a fully touch dry coating that is suitable for downstream processing will be obtained. Shadow areas, not exposed to UV light, are cured via a secondary moisture cure mechanism. The time for full cure of the whole coating therefore also depends on the environmental conditions of humidity and temperature.

For effective UV curing of UVCL, Electrolube recommend the use of standard mercury bulbs ('H' type) with typical conveyor speeds in the region of 1.0-1.5m/min. The minimum and maximum values for intensity (peak irradiance) and dosage (energy density) that should be used are as follows.

UV Lamp Outputs	Dosage (Energy Density), mJ/cm <sup>2</sup>				Intensity (Peak Irradiance), mW/cm <sup>2</sup>			
	UVA	UVB	UVC	UVV	UVA	UVB	UVC	UVV
Wavelength Range								
Minimum	1800	1500	400	1500	350	300	90	275
Maximum	2800	2500	600	2500	500	400	110	375

All values measured using an EIT 'Power Puck II' radiometer.

It is essential that the correct wavelength, intensity and dosage of UV light is determined for each application on a case by case basis, prior to commencement of production runs using UVCL. Appropriate process parameters for effective curing should be established at implementation of any UV curing system and monitored regularly to ensure continued compliance to those parameters. A portable, calibrated radiometer should be used for this purpose.

Further information is available on request.

### **Inspection**

UVCL contains a fluorescent dye, which allows 'blacklight' inspection of the PCB after coating, to ensure complete and uniform 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.

Revision 17: June 2020