MacDermid Alpha ELECTRONICS SOLUTIONS

TECHNICAL DATA SHEET

Electrolube® UVCL_FC

Low Viscosity UV Cure Conformal Coating
Asia Only

DESCRIPTION

Electrolube® UVCL_FC is a low viscosity, single-part conformal coating, which cures rapidly on exposure to the correct dose of UV light. **UVCL_FC** has a highly effective, moisture initiated secondary cure mechanism to ensure curing in shadowed areas. **UVCL_FC** is low odor, fast curing and is suitable for curing with various UV lamps. It has been specifically designed to offer the highest level of protection for electronic circuity at high production throughputs. **UVCL_FC** has been designed for application via selective spray equipment and demonstrates ease of automation.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES AND BENEFITS

- Rapid cure system with UV light
- Wide operating temperature range
- No dilution required; low viscosity, ready to use for selective spray application
- Easy inspection due to fluoresces under UV lamp
- Ultimate protection in harsh environments, including high humidity, corrosive and chemical atmospheres

APPROVALS

Standard	Status
RoHS Compliant (2015/863/EU)	Yes
IEC-61086	Meets Requirements
IPC-CC-830C	Meets Requirements

PRODUCT INFORMATION

Please contact your customer service representative for information on available package sizes.

PHYSICAL PROPERTIES

Category	Results
Liquid Properties	
Appearance	Clear Faint Yellow Liquid
Base Material	Urethane Acrylate
Density (g/mL @ 23 °C)	1.050 to 1.115
VOC Content (%)	≤ 5
Solid Content (%)	> 95
Flash Point (°C)	> 90
Viscosity (mPa·s @ 23 °C)	70 to 150
Coverage @ 100 µm	9 m^2/L
Cured Film Coating	
Color	Faint Yellow
Operating Temperature Range (°C)	-65 to 135
Recommended Coating Thickness (µm)	50 to 200
Flexibility (IPC-CC-830C)	Meets Requirement
Shore Hardness [ASTM D2240-2005 (R2010)]	A54
Tensile Strength (MPa) (ISO37:2017)	2.6
Elongation at Break (%) (ISO37:2017)	73.8
Dielectric Strength (kV/mm) (IEC 60243-1:2013)	110
Surface Resistivity (Ω) (IEC 60093:2014)	5.2×10^{13}
Volume Resistivity (Ω·cm) (IEC 60093:2014)	1.2×10^{14}
Glass Transition Temperature (°C)	6.0
Comparative Tracking Index (IEC 60112:2020)	> 600
Moisture and Insulation Resistance (IPC-CC-830C)	Meets Requirement
Fungus Resistance (IPC-TM-650 2.6.1.1-2000)	Meets Requirement

Category	Results
High Temperature High Humidity (85 °C, 85%RH)	Pass 800 hours
Thermal Shock (IPC-CC-830C @ -65 to 125 °C)	Pass 100 cycles
Salt Spray Test (IEC 60068-2-52 @ 35±2 °C, pH: 6.5 to 7.2)	Pass 168 hours

APPLICATION GUIDELINES

Substrates should be thoroughly cleaned before coating to ensure satisfactory adhesion to the substrates. 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_FC 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.

After application, units should be placed in ambient air for approximately 5 minutes before curing. UV light in the region of 365nm should be used to cure the coating. The cure rate depends on the UV intensity and the distance from the light source to the film. After use, the remaining materials should be covered immediately and filled with dry air or nitrogen. Ensure that the materials are kept away from ultraviolet rays and sunlight. The coating application must be done away from the UV light source to prevent premature curing.

APPLICATION GUIDELINES – RESIN PACKS

Spraying – Bulk

UVCL_FC is supplied at a viscosity suitable for both manual spray guns and automated spray equipment. 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. If the conformal coating is agitated, it must be left until the bubbles disappear. Fluid transfer lines, nozzles and applicator heads should all be immersed in a suitable solvent when not in use.

A range of application thicknesses are possible with UVCL_FC, 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 to 200µm 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.

TYPICAL PRODUCT APPLICATION

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 minimized 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_FC has been exposed to the recommended UV curing regime (detailed in table below), 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 for 7 days at ambient moisture. Generally, after UV exposure, full cure depends on environmental conditions such as humidity and temperature.

The type of light source also affects the curing rate. UVCL_FC is suitable for various types of UV bulbs with typical conveyor speeds in the region of 1.0 to 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^2				Intensity (Peak Irradiance), mW/cm^2			
Wavelength Range	UVA	UVB	UVC	UVV	UVA	UVB	UVC	UVV
Minimum	800	500	130	800	200	100	60	200
Maximum	3000	2000	1000	3000	2000	2000	500	2000

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_FC. 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_FC 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 375 nm should be used for inspection.

ADDITIONAL INFORMATION

Shelf Life: 6 Months

UVCL_FC should be stored away from excessive heat and humidity, in tightly closed opaque containers at 5 to 28 °C to ensure maximum shelf life is achieved.

SAFETY & WARNING

It is recommended that the company/operator read and review the Safety Data Sheets for the appropriate health and safety warnings before use. **Safety Data Sheets are available.**

CONTACT INFORMATION

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