HumiSeal® UV40 UV Curable Conformal Coating
Technical Data Sheet

HumiSeal® UV40 is a single component, high solids, UV curable, acrylated polyurethane conformal coating that possesses excellent chemical resistance, surface hardness, flexibility and moisture resistance. The material is tack-free after exposure to UV light. A secondary moisture cure mechanism will cure unexposed areas of the coating within 2-3 days at ambient conditions. The coating fluoresces under UV light to allow for coating inspection and can be applied by selective coating equipment. HumiSeal® UV40 coating is recognized under UL File Number E105698, and is MIL-I-46058C qualified, and IPC-CC-830 and RoHS Directive 2011/65/EC compliant.

Typical Properties of HumiSeal® UV40

Density	1.10 ± 0.05 g/cm^3
Minimum Solids Content	95 %
Viscosity, per Fed-Std-141, Meth. 4287	650 ± 150 centipoise
Recommended Coating Thickness	25 - 125 microns
Recommended UV Cure*	See curing section below
Shelf Life at Room Temperature, DOM	12 months
Recommended Stripper**	HumiSeal® Stripper 1100
Thermal Shock, 50 cycles per MIL-I-46058C	-65°C to 125°C
Glass Transition Temperature - DSC	45°C
Coefficient of Thermal Expansion - TMA	85 ppm/°C Below T_g 197 ppm/°C Above T_g
Modulus - DMA	10360 MPa @ -40ºC 4280 MPa @ 25ºC 66 MPa @ 80ºC
Flammability, per UL-94	V-0
Dielectric Withstand Voltage, per MIL-I-46058C	>1500 volts
Dielectric Constant, at 1MHz and 25°C per ASTM D150-98	2.5
Dielectric Constant, at 10GHz and 22°C per ASTM D2520	3.21
Dissipation Factor, at 1MHz and 25°C per ASTM D150-98	0.01
Insulation Resistance, per MIL-I-46058C	8.0 x 10^{14} ohms (800TΩ)
Moisture Insulation Resistance, per MIL-I-46058C	4.7 x 10^{10} ohms (47GΩ)
Fungus Resistance, per ASTM G21	Pass
Resistance to Chemicals	Excellent

*Microwave UV cure ovens equipped with “H” style bulbs recommended
**Stripper 1100 is not available in the EU

Application of HumiSeal® UV40

Conformal coatings can be successfully applied to substrates that have been cleaned prior to coating and also to substrates assembled with low residue, “no clean” assembly materials. Users should perform adequate testing to confirm compatibility between the conformal coating and their particular assembly materials, process conditions and cleanliness level. Please contact HumiSeal® for additional information.

Spraying
HumiSeal® UV40 can be applied via standard selective coating equipment or by conventional hand spray equipment. The source air used for spraying must be dry (a dry inert gas is highly recommended) to prevent premature curing of the secondary cure mechanism. The spraying should be done with adequate ventilation so that the vapor and mist are carried away from the operator.

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Brushing
HumiSeal® UV40 may be applied by brush for rework or touch up only. Brush must be cleaned with solvent promptly after use.

Curing
HumiSeal® UV40 is a highly cross linked coating. In order to achieve maximum cross linking density, the product must be exposed to the correct spectral output. Humiseal has modelled the performance of UV40 using Arc and Microwave based UV curing equipment. The table below outlines the required dosage and irradiance values necessary to render HumiSeal® UV40 tack free post UV exposure with both equipment types. Minimum figures should provide a tack free surface. The maximum recommendation represents highest tested values by Humiseal. The cure recommendations may change as curing technology develops.

		Dose J/cm2*			Irradiance W/cm2*		
		UVA	UVB	UVC	UVA	UVB	UVC
Min	Arc System	1.5	1.5	0.40	0.50	0.50	0.10
Min	Microwave System	2.0	2.0	0.40	0.70	0.70	0.15
Max	Arc System	2.8	2.7	0.80	0.90	0.80	0.20
Max	Microwave System	3.0	3.0	0.60	1.15	1.15	0.24

**Values measured with a Powerpuck II UV radiometer*

Heat is also an important component with UV cure, and different systems produce different heat outputs. Higher heat levels allow UV cure at lower dose/irradiance levels. Consequently, Humiseal recommend that curing is discussed with HumiSeal® Technical staff to ensure the exact customer process being used will meet the coating cure requirements. After UV exposure and return to room temperature the coating should be tack free.

HumiSeal® UV40 contains a reliable secondary moisture cure mechanism which will cure any shadow areas on the assembly within 7 days at ambient moisture.

HumiSeal® UV40 was designed to be cured using a microwave UV oven equipped with an “H” style bulb. Arc systems can cure HumiSeal® UV40 however care must be taken during the equipment selection process to ensure minimum dosage and irradiance values obtained will properly cure the coating. Because of the variations possible in curing equipment type and configuration, it is strongly recommended that you contact HumiSeal Technical Support to discuss your equipment and process in detail.

Clean Up
To flush equipment and clean uncured HumiSeal® UV40, non-alcohol based solvents should be used. HumiSeal® Thinner 521 or Thinner 521EU is recommended.

Rework
HumiSeal® UV40 is a highly cross linked UV cured coating. The cured film has a high degree of environmental and chemical resistance and will be more difficult to remove than traditional conformal coatings. Thermal displacement, mechanical abrasion and, where available, HumiSeal® Stripper 1100 are suitable options for rework of HumiSeal® UV40.

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Storage

HumiSeal® UV40 is photosensitive. The product should not be exposed to direct sunlight or full spectrum fluorescent lighting. HumiSeal® UV40 should be stored away from excessive heat, in tightly closed opaque containers at 0 to 25°C to ensure maximum shelf life is achieved. Prior to use, allow the product to equilibrate for 24 hours at room temperature. HumiSeal® UV40 is a moisture curing material and care should be taken to protect process vessels and partial containers from moisture. Partial containers must be purged with a dry, inert gas such as dry air, nitrogen or argon before closure, otherwise premature polymerization by atmospheric moisture will occur.

Caution

Application of HumiSeal® Conformal Coatings should be carried out in accordance with local and National Health and Safety regulations.

Use only in well-ventilated areas to avoid inhalation of vapours or spray. Avoid contact with skin and eyes.

Consult MSDS/SDS prior to use.

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