



# UV40 Dual Cure Acrylated Urethane Coating

## Technical Data Sheet

### System Description

HumiSeal UV40 is a one-part high solids dual cure acrylated polyurethane conformal coating possessing excellent chemical resistance, surface hardness, flexibility and moisture resistance. The material is tack free after exposure to UV light and the secondary moisture cure mechanism will fully cure any unexposed areas of the coating within 2-3 days at ambient conditions. The secondary cure can be accelerated by baking at 60-80°C with a small pan of water placed in the oven to increase humidity. The coating fluoresces under UV light to allow coating inspection and can be applied by all selective coating equipment. This coating is MIL-I-46058C and IPC-CC-830 qualified and is recognized under the Component Program of Underwriters Laboratories, Inc., File Number E 105698. HumiSeal UV40 is in full compliance with the RoHS Directive (Directive 2002/95/EC).

### Properties of Liquid HumiSeal UV40

Density	1.06 g/cm <sup>3</sup>
Solids Content	100%
Viscosity (max)	800 cps
Flashpoint, °C (°F)	80 (176)
Recommended Coating Thickness	1-5 mils
Recommended UV Curing Conditions	1-4 W/cm <sup>2</sup> *
<small>*Using Fusion "H" style bulb with power output of 120 W/cm, total power 1800W)</small>	
Secondary Cure (for shadow areas)	2-3 days at ambient or 2-4 hrs at 60-80°C*
<small>(*Place open pan of water in oven during curing)</small>	
Recommended Removal Method	Thermal burn-through
Shelf Life at Room Temperature	6 months from date of shipment

### Properties of Cured HumiSeal UV40

#### Thermal Properties

Continuous Use Operating Range	-65°C (-85°F) to +135°C (275°F)
Thermal Shock, per MIL-I-46058C	-65°C (-85°F) to +125°C (227°F)
Solder Through for Rework?	Yes
Glass Transition Temperature, DSC	45°C
Coefficient of Thermal Expansion	
Below T <sub>g</sub>	85 ppm/°C
Above T <sub>g</sub>	197 ppm/°C

#### Physical Properties

Clarity	Transparent
Flexibility, per MIL-I-46058C	Excellent
Adhesion, per ASTM, Meth. D2197	Excellent
Flammability, per ASTM, Meth. D635	Self-Extinguishing
Flammability, per UL-94	94V-0
Weather Resistance	Very Good

#### Electrical Properties

Dielectric Withstand Voltage, volts per MIL-I-46058C	>7,500
Dielectric Constant, at 1MHz and 25°C, per ASTM-D150-65T	2.5
Dissipation Factor, at 1MHz and 25°C, per ASTM-D150-65T	0.01
Insulation Resistance, ohms, per MIL-I-46058C	8.0 x 10 <sup>14</sup> (800T)
Moisture Resistance, ohms, per MIL-I-46058C	6.0 x 10 <sup>10</sup> (60G)

## Chemical Properties

Main Constituents  
Fungus Resistance, per ASTM-G21  
Resistance to Chemicals  
Recommended Stripper

Urethane, Acrylic  
Pass  
Excellent  
Stripper 1072 (or solder through for rework)

Values are not intended for use in preparation of specifications.

## APPLICATION

Cleanliness of the substrate is of extreme importance for the successful application of a conformal coating. Surfaces must be free of moisture, dirt, wax, grease and all other contaminants. Contamination under the coating will cause problems that may lead to assembly failures.

### Dipping

HumiSeal UV40 is not suitable for dipping.

### UV40 - 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 UV40's effective secondary cure mechanism.. The spraying should be done with adequate ventilation so that the vapor and mist are carried away from the operator.

## UV40 – Selective Conformal Coating Equipment

### Asymtek Model 740 / 741 Nominal Settings

These settings are provided to assist with start-up only. The actual settings will be determined by actual site conditions!

Applicator Head	SC-300	SC-300	SC-300
Application Mode	Swirl/Monofilament/Bead	Swirl/Monofilament/Bead	Swirl/Monofilament/Bead
Material Heating	No	No	No
Nozzle	.26	.41L	.61L
Extension	10 degree	10 degree	10 degree
Air Assist/Swirl (psi)	25	40-50	20
Air Assist /Mono (psi)	24	30	10
Fluid Pressure/High (psi)	30	30	30
Fluid Pressure/Low (psi)	25	8-10	8
Mono Fluid Regulator	5 Turns (M)	4 Turns (M)	5 Turns (M)
Micro Adjust	1 Turn	3 Turns	5 Turns
Dispense Height (mm)	10 (S)-10(M)-10(B)	9(S)-10(M)-9(B)	9(S)-9.5(M)-9.5(B)
Speed (mm/sec)	80(S)-70(M)-120(B)	100(S)-100(M)-100(B)	25(S)-50(M)-225(B)
Width (mm)	10(S)-10(M)-3.5(B)	10(S)-10(M)-3(B)	10(S)-10(M)-3(B)
Dry Thickness (mil/mic.)	4 /100 (S,M)	3 / 75 (S) and 4 /100 (M)	3 / 75 (S) and 4 /100 (M)

Note: S = Swirl, M = Monofilament, B = Bead

### PVA Model 2000 Nominal Settings

These settings are provided to assist with start-up only. The actual settings will be determined by actual site conditions!

Applicator	PVA 2000 FCS100-ES	FC100 Needle
Fluid Pressure	22-25 psi	22 psi
Atomizing Pressure	4-6 psi	na
Speed	100-150 mm/sec	25.4 mm/sec
Height	1 inch	variable
Stroke	1/2-3/4 turn open	1 turn open
Area Space	4mm	na
Dry Thickness (mil/mic.)	3-4 / 75-100	

### Brushing – UV40

HumiSeal UV40 may be applied by brush. The actual uniformity of the finished coating will depend on component density and operator technique. Brushed may be cleaned promptly using solvent.

### Clean Up

To flush equipment and clean uncured UV40, organic solvents such as methyl ethyl ketone, t-butylacetate, glycol ether acetates etc. can be used.

### Rework

HumiSeal UV40 is a highly crosslinked 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. The following options are available for rework of UV40.

**Thermal Removal:** The most effective method for removal of UV40 for selective rework applications is to burn through the coating directly using a hot soldering iron. The high temperature of the soldering iron (typically 300-400C) softens and decomposes the coating and allows it to be easily displaced from the substrate. This allows access to the underlying solder connections for component removal and replacement. A hot air desoldering tool may also be used also. Apply heat to the desired area and the coating can be removed mechanically after it softens. Care should be taken to avoid damage to any heat sensitive components.

**Mechanical Removal:** This method involves the use of “micro-blasting” equipment that safely removes the cured coating by using a pressurized abrasive. After coating removal, the abrasive can be removed from the assembly surface without damage to the components. HumiSeal UV40 has been successfully removed using the Micro-Blaster System from Comco Inc. (800-796-6626, [www.comcoinc.com](http://www.comcoinc.com)), but there are several companies that supply similar systems.

**Chemical Removal:** If the UV40 coating has been UV cured only and not allowed to undergo any further moisture curing, HumiSeal Stripper 1072 could be used to remove the UV-cured film. Extended dwell times and periodic mechanical agitation could be required. Warming the 1072 solution can increase its effectiveness.

### Storage

Refer to MSDS to insure proper storage conditions. HumiSeal UV40 should be stored at 0-100<sup>0</sup>F, away from excessive heat, in tightly closed opaque containers. Prior to use allow the product to equilibrate for 24 hours at room temperature. Since UV40 is photosensitive, the product should not be exposed to direct sunlight or full spectrum fluorescent lighting. UV40 is a moisture curing material and care should be taken to protect process vessels and partial containers from moisture. Partial, opened containers should be purged with a dry, inert gas such as dry air, nitrogen or argon before closure, otherwise premature polymerization by atmospheric moisture will occur.

All technical data in this bulletin is based on test results and is believed to be correct. However, since the end use of HumiSeal materials (and the manner of storing and handling them) is beyond our control, we make no warranty-expressed or implied as to the fitness of use, results to be obtained from or effects of use with respect to these materials. Their use shall be solely by the judgment of and at the risk of the user notwithstanding any statement in this bulletin. © Copyright 1992 CHASE CORPORATION.

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