

HumiSeal® UV500-2
UV Curable Conformal Coating
Technical Data Sheet

HumiSeal® UV500-2 is a high solids UV dual cure elastomeric acrylate conformal coating, with higher flexibility compared to other UV curable conformal coatings. Its formula is based on HumiSeal UV500 and is formulated at higher viscosity to allow use with alternate application systems, and also to reduce capillarity and flow.

HumiSeal® UV500-2 has been specifically developed to:

- Have excellent flexibility.
- Have excellent moisture resistance.
- Have highly stable electrical insulation properties.
- Have good chemical resistance.
- Show excellent performance in thermal cycling tests.
- Fluorescence under UV light to allow coating inspection.
- Cure tack-free with microwave or arc UV light.
- Have a secondary cue mechanism that will fully cure any unexposed areas of the coating within 7 days at ambient conditions

HumiSeal® UV500-2 meets the following standards:

- IEC 61086 Class 2
- IEC 60664-3
- HKMC MS941-04
- BMW group standard GS 95011-5.
- UL94 V1
- Compliant with RoHS Directive EU 2015/863
- Compliant with China RoHS 2
- Compliant to China Standard GB30981-2020

Properties of HumiSeal® UV500-2 Liquid Coating

Density	1.0 to 1.1 g/cm^3
Minimum Solids Content, % by weight	98%
Viscosity, at 25C	400 to 600 centipoise
Shelf Life at Room Temperature, DOM	9 Months
Recommended UV Cure	See Curing Below

Properties of HumiSeal® UV500-2 Cured Coating

Coating Thickness, as recommended by IPC guidelines	25 - 125 microns
Coating Thickness, as recommended for application	75 - 130 microns
Time to reach optimum properties	7 days after UV cure
Operating temperature range	-65°C to 150°C
Thermal Shock, 1000 cycles	-65°C to 150°C
Glass Transition Temperature - DSC	-43°C
Coefficient of Thermal Expansion - TMA	137ppm/°C Below Tg 311ppm/°C Above Tg
Modulus – DMA	0.4MPa @ 25°C

Dielectric Withstand Voltage (Per MIL-I-46058C)	>1500V
Surface Insulation Resistance (per IPC J-STD-004 (mod.))	9.0 $\log_{10}$ ohms
Salt Spray Resistance (Per IEC60068-2-11)	Passes
Flammability, per UL-94	V1
Thermal Conductivity	0.505 W/mK
Dielectric Constant at 10GHz and 22C Per ASTM-D2520	3.07
Dissipation Factor at 10GHz and 22C Per ASTM-D2520	0.03
Damp Heat Insulation Resistance (40C/90% RH)	10.3 $\log_{10}$ ohms

Application of HumiSeal® UV500-2

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® UV500-2 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 air supply or dry inert gas (nitrogen or argon) 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.

Brushing

HumiSeal® UV500-2 may be applied by brush for rework or touch up only. Brush must be cleaned with solvent promptly after use.

Curing

HumiSeal® UV500-2 is a highly crosslinked coating. In order to achieve maximum crosslinking density, the product must be exposed to the correct spectral output. HumiSeal has modelled the performance of UV500-2 using Arc and Microwave based UV curing equipment. The table below outlines the minimum required dosage and irradiance values necessary to render HumiSeal® UV500-2 tack free post UV exposure with both equipment types. These figures should provide a tack free surface. HumiSeal recommend that these figures are for guidance only, and users should assess exact cure requirements with their own systems. These cure recommendations may change as curing technology develops.

	Minimum Dose J/cm2*			Minimum Irradiance W/cm2*		
	UVA	UVB	UVC	UVA	UVB	UVC
Arc System	2.8	2.8	0.45	1.1	1.1	0.2
Microwave System	3.0	3.0	0.5	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® UV500-2 contains a reliable secondary moisture cure mechanism which will cure any shadow areas on the assembly within 7 days at ambient moisture.

Clean Up
To flush equipment and clean uncured HumiSeal® UV500-2, non-alcohol based solvents should be used. HumiSeal® Thinner 521 or Thinner 521EU is recommended.

Rework
HumiSeal® UV500-2 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. Thermal displacement and mechanical abrasion are suitable options for rework of HumiSeal® UV500-2.

Storage
HumiSeal® UV500-2 is photosensitive. The product should not be exposed to direct sunlight or full spectrum fluorescent lighting. HumiSeal® UV500-2 should be stored cool below 20°C, to maximize shelf life. Prior to use, allow the product to equilibrate for 24 hours at room temperature. HumiSeal® UV500-2 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 SDS prior to use.

Contact HumiSeal®

HumiSeal North America
201 Zeta Drive
Pittsburgh, PA 15238
USA
Tel: +1 412-828-1500
Toll Free (US only): 866-828-5470
sales@humiseal.com

HumiSeal Technical Center
295 University Avenue
Westwood, MA 02090
USA
Tel: +1 781-332-0734
Fax: +1 781-332-0703
techsupport@humiseal.com

HumiSeal Europe
505 Eskdale Road, IQ Winnersh
Berkshire RG41 5TU
UK
Tel: +44 (0)1189 442 333
Fax: +44 (0)1189 335 799
europeansales@chasecorp.com

HumiSeal India
J-154, M.I.D.C Bhosari
Pune 411 026
Maharashtra
India
Tel: +91 20 66308098
indiatechsupport@chasecorp.com

HumiSeal S.A.R.L
4/6 Avenue Eiffel
78420 Carrieres-Sur-Seine
France
Tel: +33 (0) 1 30 09 86 86
Fax: +33 (0) 1 30 09 86 87
humiseal.sarl@chasecorp.com

HumiSeal Asian Support
Tel: 852-9451-6434
Fax: 852-2413-6289
asiatechsupport@humiseal.com

HumiSeal Europe Support
Tel: +44 (0)1189 442 333
Fax: +44 (0)1189 335 799
europetechsupport@chasecorp.com

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