HumiSeal® UV500 UV Curable Conformal Coating Preliminary Technical Data Sheet

HumiSeal UV500 high solids UV dual cure elastomeric acrylate conformal coating possessing excellent flexibility, moisture resistance and electrical insulation properties as well as good chemical resistance. The formulation allows chemical stripping using a dedicated stripper.

UV500 is tack free after exposure to UV light and the secondary moisture cure mechanism will fully cure any unexposed areas of the coating within 7 days at ambient conditions. The secondary cure can be accelerated by baking at 60-80°C at elevated humidity levels.

Cured UV500 has a higher flexibility compared to other UV curable conformal coatings, giving improved performance in thermal cycling tests.

The coating fluoresces under UV light to allow coating inspection and can be applied by all selective coating equipment.

**Typical Properties of HumiSeal® UV500**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>1.0 to 1.1 g/cm³</td>
</tr>
<tr>
<td>Minimum Solids Content</td>
<td>98 %</td>
</tr>
<tr>
<td>Viscosity, per Fed-Std-141, Meth. 4287</td>
<td>350 to 450 centipoise</td>
</tr>
<tr>
<td>Recommended Coating Thickness</td>
<td>25 - 125 microns</td>
</tr>
<tr>
<td>Recommended UV Dose*</td>
<td>See Below</td>
</tr>
<tr>
<td>Shelf Life at Room Temperature, DOM</td>
<td>TBD</td>
</tr>
<tr>
<td>Glass Transition Temperature - DSC</td>
<td>-43°C</td>
</tr>
<tr>
<td>Coefficient of Thermal Expansion – TMA</td>
<td>137ppm/°C Below Tg</td>
</tr>
<tr>
<td></td>
<td>311ppm/°C Above Tg</td>
</tr>
<tr>
<td>Modulus – DMA</td>
<td>0.4MPa @ 25°C</td>
</tr>
<tr>
<td>Flammability, per UL-94</td>
<td>Pending</td>
</tr>
<tr>
<td>Dielectric Withstand Voltage, per MIL-I-46058C</td>
<td>Pending</td>
</tr>
<tr>
<td>Dissipation Factor at 1MHz and 25°C per ASTM D150-98</td>
<td>Pending</td>
</tr>
<tr>
<td>Insulation Resistance, per MIL-I-46058C</td>
<td>Pending</td>
</tr>
<tr>
<td>Moisture Insulation Resistance, per MIL-I-46058C</td>
<td>Pending</td>
</tr>
<tr>
<td>Fungus Resistance, per ASTM G21</td>
<td>Pending</td>
</tr>
<tr>
<td>Resistance to Chemicals</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

*Microwave UV cure ovens equipped with “H” style bulbs recommended

**Application of HumiSeal® UV500**

Cleanliness of the substrate is extremely important to the successful application of a conformal coating. Surfaces should be free of moisture, dirt, wax, grease and all other contaminants. Otherwise, ionic or organic residues on the substrate could be trapped under the coating and cause problems with adhesion or electrical properties. The highest long term reliability for a coated printed circuit assembly will be when the conformal coating is applied over a clean, dry substrate.

The application of conformal coatings over no clean flux is a common practice. The user should perform adequate testing to confirm compatibility between the conformal coating and their particular assembly materials and process conditions. Please contact HumiSeal for additional information.
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Spraying
HumiSeal® UV500 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.

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

Clean Up
To flush equipment and clean uncured HumiSeal® UV500, non-alcohol based solvents should be used. HumiSeal® Thinner 600 is recommended.

Curing
HumiSeal® UV500 is a highly cross linked coating. In order to achieve maximum cross linking density the product must be exposed to the correct spectral output. The table below outlines the required dosage and irradiance values necessary to properly cure HumiSeal® UV500. After UV exposure and return to room temperature the coating should be tack free.

<table>
<thead>
<tr>
<th></th>
<th>DOSE J/cm²</th>
<th></th>
<th>IRRADIANCE W/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UV A</td>
<td>UV B</td>
<td>UV C</td>
</tr>
<tr>
<td>MIN</td>
<td>0.700</td>
<td>0.700</td>
<td>0.150</td>
</tr>
<tr>
<td>MAX</td>
<td>3.000</td>
<td>3.000</td>
<td>0.600</td>
</tr>
</tbody>
</table>

*values measured with a Powerpuck II UV radiometer*

HumiSeal® UV500 was designed to be cured using a microwave UV oven equipped with an “H” style bulb. Arc systems can cure HumiSeal® UV500 however care must be taken during the equipment selection process to ensure minimum dosage and irradiance values can be obtained. For additional cure information please contact HumiSeal technical assistance.

Rework
HumiSeal® UV500 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 and mechanical abrasion are suitable options for rework of HumiSeal® UV500. Humiseal stripper 1072 and 1100 can be used effectively to remove UV500 after full moisture cure.

Storage
HumiSeal® UV500 is photosensitive. The product should not be exposed to direct sunlight or full spectrum fluorescent lighting. HumiSeal® UV500 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 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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