

HumiSeal 1A33

Polyurethane Conformal Coating

System Description

A single component, fast air drying polyurethane coating, well suited for general printed circuit board applications. Contains no free isocyanates. Qualified to MIL-I-46058C, Type UR. Contains fluorescent tracer for inspection purposes. U.L. recognized under the component program of Underwriters Laboratory. File No. E105698.

Properties of Liquid HumiSeal

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|--|--------------------------------|
| Density, (g/cm ³) per ASTM, Meth. D1475 | 0.94 ± 0.02 |
| Solids Content, % by weight per Fed-Std-141, Meth.4044 | 44 ± 1 |
| Viscosity, centipoise per Fed-Std--141, Meth. 4287 | 180 ± 20 |
| Flashpoint, °C (°F) per ASTM, Meth. D56 | -1 |
| Drying Time to Handle per Fed-Std-141, Meth.4061 | 15 minutes |
| Recommended Coating Thickness | 1-3 mils |
| Recommended Curing Conditions | 30 days @ RT or 30 hrs. @ 76°C |
| Time Required to Reach Optimum Properties | 7 days |
| Thinner, if needed (dipping, brushing & spraying) | Thinner 521 |
| Recommended Stripper | Stripper 1063 |
| Pot Life at Room Temperature | 18 months |
| Shelf Life at Room Temperature | 18 months |

Properties of Cured HumiSeal

Thermal Properties

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|--|-----------------|
| Continuous Use Operating Range °C(°F) | -65°C to +125°C |
| Thermal Shock, per MIL-I-46058C | Passes |
| Solderability | Excellent |
| Coefficient of Thermal Expansion - DMA | 193ppm /°C |
| Glass Transition Temperature - TMA | 26°C |

Physical Properties

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|------------------------------------|--------------------|
| Clarity | Transparent |
| Flexibility, | Excellent |
| Adhesion, per ASTM, Meth. D2197 | Excellent |
| Flammability, per ASTM, Meth. D635 | Self-Extinguishing |
| Weather Resistance | Very Good |

Electrical Properties

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|---|------------------------|
| Dielectric Withstand Voltage, volts per MIL-I-46058C | >1,500 |
| Dielectric Breakdown Voltage, volts, per ASTM, Meth. D149 | 7500 |
| Dielectric Constant, at 1MHz and 25°C, per ASTM-D150-65T | 3.6 |
| Dissipation Factor, at 1MHz and 25°C, per ASTM-D150-65T | 0.03 |
| Insulation Resistance, ohms, per MIL-I-46058C | 200 x 10 ¹² |
| Moisture Resistance, ohms, per MIL-I-46058C | 16 x 10 ⁹ |

Chemical Properties

| | |
|---------------------------------|--------------|
| Main Constituent | Polyurethane |
| Fungus Resistance, per ASTM-G21 | Pass |
| Resistance to Chemicals | Good |

Values are not intended for use in preparations 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, which may lead to assembly failures.

Dipping

Depending on the complexity, density and configuration of components on the assembly, it may be necessary to reduce the viscosity of HumiSeal 1A33 with HumiSeal Thinner 521 in order to obtain a uniform film. Once optimum viscosity is determined, a controlled rate of immersion and withdrawal (2 to 6" per minute) will further insure even deposition of the coating and ultimately a uniform film. During the application, evaporation of solvent causes an increase in viscosity, which should be adjusted by adding small amounts of Thinner 521. Viscosity in the dip tank should be regularly checked by the use of a simple measuring device such as a Zahn or Ford viscosity cup.

Spraying

HumiSeal Type 1A33 can be sprayed using conventional spraying equipment. As a rule, the addition of Thinner 521 is necessary to assure a uniform spray pattern resulting in pinhole free film. The amount of thinner and spray pressure will depend on the specific type of spray equipment used. The spraying should be done under an exhaust hood so that the vapour and mist are carried away from the operator. The ratio of HumiSeal Type 1A33 to HumiSeal Thinner 521 is 1 to 1 by volume as a starting point.

Brushing

HumiSeal Type 1A33 may be brushed with a small addition of HumiSeal Thinner 521. Uniformity of the film depends on component density and operator's technique.

Storage

HumiSeal Type 1A33 should be stored at room temperature, away from excessive heat, in tightly closed containers. HumiSeal products may be stored at temperatures of -5-25°C. Avoid direct sunlight. Prior to use, allow the product to equilibrate for 24 hours at room temperature.

Caution

The solvents in Type 1A33 are flammable. Do not use in presence of open flame or sparks. Avoid inhalation of vapours or spray. Use only in well-ventilated areas. Avoid contact with skin and eyes. If contact occurs, wash with soap and water. If swallowed, call physician immediately. HumiSeal Type 1A33 contains no traces of monomeric isocyanate. Refer to MSDS before use.

Cure Mechanism 1A33

1A33 dries to the touch in less than one half-hour. After this initial solvent evaporation prepolymers will react with oxygen in the air to cure to its distinctive coating properties. This type of oxidation cure is similar to that of many traditional paints. The reaction depends on exposure to oxygen to cure properly; if oxygen is not available or refreshed the coating will not cure properly or according to spec. Also when baking the stipulation that a constant oxygen supply is necessary for curing. 1A33 should be completely cured prior to testing. If they are to be in an enclosed housing the coated boards should be baked to ensure completion. One way to identify completely cured 1A33 is that when exposed to isopropyl alcohol cured 1A33 will not show signs of wear. 1A33 should be applied at a thickness between 1 to 3 mils, thickness' exceeding 5 mils may crack.

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