

1H2O AR3 Water Based Acrylic Coating

TECHNICAL DATA SHEET

System Description

1H2O AR3 is a high performance, high solids, fast drying water-based acrylic conformal coating, especially suited to high volume, in-line dip coating application. It is available in two versions suitable for either dip, spray, brush or selective spray application methods.

1H2O AR3 is qualified to IPC-CC-830B Class B. It provides excellent moisture insulation resistance and can be chemically removed or soldered through for rework. The coating contains a UV tracer for ease of inspection.

Properties of Liquid HumiSeal 1H2O AR3

Properties	1H2O AR3 / D	1H2O AR3 / S
Density (g/cm ³)	1.05	1.02
Solid Content (%)	45%	45%
Flash Point	> 100C	> 100C
Viscosity max	500 cPs	50 cPs
Touch dry time	20 minutes	20 minutes
Recommended curing	1 hour at RT then 6 hours at 80C	1 hour at RT then 6 hours at 80C
Time to reach optimum properties	7 days	7 days
Pot life at Room Temperature	6 months in a dip tank	N/A
Shelf life at Room Temperature	12 months	12 months
Application method	Dipping, brushing	Spraying, brushing

Properties of Cured HumiSeal 1H2O AR3

Thermal Properties

Continuous Use Operating Range ^{°C} (^{°F})	-65°C to +125°C
Thermal Shock, per MIL-I-46058C	Passes

Physical Properties

Clarity	Clear
Build per Dip, mils, per ASTM, Meth.D823	1.5
Flexibility, per MIL-I-46058C	Pass
Adhesion, per ASTM, Meth. D2197	Good
Flammability, per ASTM, Meth. D635	Self-Extinguishing
Weather Resistance	Very Good
Temperature & Humidity Aging per IPC-TM-650 2.6.11	Pass

Electrical Properties

Dielectric Withstand Voltage, volts per MIL-I-46058C	>1,500
Dielectric Breakdown Voltage, volts, per ASTM, Meth. D149	6925V
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	2.3×10^{13}
Moisture Resistance, ohms, per MIL-I-46058C	8.2×10^{10}

Chemical Properties

Main Constituent	Acrylic Resin
Fungus Resistance, per ASTM-G21	Pass
Resistance to Chemicals	Good
Recommended Stripper	HumiSeal Stripper 1020

Values are not intended for use in preparation of specifications.

APPLICATION GUIDELINES

CAUTIONS!

Waterborne coatings should not be placed directly on bare/untreated steel.

Applying waterborne coatings when the relative humidity is > 80% will adversely affect coating uniformity and cause poor adhesion.

General

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.

When 1H2O AR3 is first applied, it has a milky white appearance. This is normal and as the film dries, the white color fades until a clear, transparent film remains. In fact, the white color aids the operator's coverage inspection and serves as an indicator that the coating is dry to the touch. 1H2O AR3 includes a UV tracer to permit final inspection. It is recommended that the coating be allowed to reach a tack free condition, to ensure that the optimum film-forming process can occur, before using heat to accelerate the state of cure - if desired.

1H2O AR3/D - Automated Dip Application

The material has been formulated for dip application as supplied and requires no thinning. Thinning will reduce the application performance and increase curing time substantially and is not recommended.

Because it is a water based coating, evaporation of 1H2O AR3/D from the dip tank is very low. However, over a long period of time, the addition of a small amount of fresh 1H2O AR3/S is beneficial; to replace the low level of coalescing solvents that are lost along with some water. The coalescing solvents are essential to provide optimum film formation and the other physical and electrical properties of the resin.

A slightly slower immersion speed is recommended to reduce the possibility of air entrapment under components. The withdrawal speed depends on the complexity of the assembly being coated. Although the material has been formulated to lay down 1.5 mils in a single dip application; for densely populated assemblies, reducing the withdrawal speed or applying two successive thinner coatings will give better edge coverage and a better coating appearance.

1H2O AR3/S Spray Application

1H2O AR3/S has been formulated with the optimum levels of additives to enable the best application performance through a wide variety of spray equipment. Thinning is not recommended.

It is important to ensure that the spray equipment has been thoroughly purged of all solvents and previous coatings prior to the application of water-based products.

If the equipment has previously been used for solvent based coatings, the following cleaning procedure is recommended.

1. Flush the equipment with solvent thinner until there is no further sign of UV tracer in the output.
2. Flush with IPA or other water miscible solvent.
3. Flush with DI water.
4. Finally, purge with 1H2O AR3 until the output stream is homogenous.

The equipment is now ready for successful application of 1H2O AR3.

Hand Spray Equipment:

The equipment settings for spraying are dependent on ambient conditions and equipment design. However, an atomization pressure of around 40-60 psi is recommended. The lower the pressure used, the better chance to ensure bubble free coatings. It is best to keep the nozzle wet when not in use to prevent coating from curing in the nozzle head. If the gun is to be left unused for more than 15 minutes, make sure that the head is submerged in water.

It is recommended that the coating be applied in four distinct layers. This is achieved by spraying the board from one direction with a side-to-side motion. The board is then rotated 90° and the process repeated, until the board has passed through 360°, thus ensuring optimum edge coverage.

1H2O AR3/S Brush Application

1H2O AR3/S can be also applied by brush. The finish quality obtained depends on operator technique and the thickness of coating applied. For best results, the material should be "flowed" from the brush onto the board and the coating should be applied as thinly as possible. It is always possible to add an additional layer if more coating is required.

Provided the material is transferred from bulk to a small pot for application purposes, no thinners are necessary. 1H2O AR3 has a pot life of 1 week in the brush pot. Brushes can be cleaned promptly after use with DI water.

Storage

HumiSeal 1H2O AR3 should be stored in its original container in temperature between 5-25C. Avoid freezing, since this will compromise performance of the product.

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