Acrylic Resin 101:

Coating Fact Sheet

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Acrylic Resin Process

Acrylic Resins (Type AR)) can be applied three ways: spray, dip, brush. The method of application will depend on the complexity of the masking involved, project volume, and costs of each method.

Spray application can be done via hand-spray, aerosol can, or by robotics. The material is usually diluted with solvents to get to a predetermined viscosity and is sprayed from all four quadrants at a 45 degree angle, when done manually or with aerosols. Robotic spray application is very useful whenever there is low board complexity, high volumes, and high repeatability. Unless these criteria are met, the cost of a skilled operator and programming time often outweigh the benefits of robotic spray.

Some advantages for spray coating are:

- High volume capable
- Reduced masking in comparison to the dip method
- Better tip and side edge coverage
- More uniform thickness
- Suitable for all conformal coatings

Dip coating is typically done by an automated machine, although it can be done manually as well. The assemblies are typically hung by an arm and then lowered in a dip tank containing the coating with an immersion rate determined by the population density of the PCB to be dipped and the desired thickness of the coating.

Some advantages to dip coating are:

- Coating penetration under components
- Coating thickness can be assured
- High volume capable
- Typical low process time

Brush coating is done manually by an operator with a brush. Brush coating is mainly employed during coating touchup operations or for conformal coating rework.

Some advantages to brush coating are:

- Cost effective for low volume projects
- Low startup cost

The Benefits of Acrylic Conformal Coating

Acrylic conformal coating offers its many benefits as your conformal coating of choice. The main benefits of acrylic conformal coating are the ease of use, physical properties, and their low costs.

Acrylic conformal coating is very user friendly, allowing for the ease of application either by brush, dip, or spray. As a result of this ease of use, acrylic conformal coatings typically result in the fastest turn time.

Acrylic conformal coatings have excellent physical properties, which are attained very quickly because of their rapid drying nature. They are fungus resistant, provide longer than average pot life, and have excellent moisture protection.

The ease of use directly ties into the next main and most important benefit to you, lower costs. Typically, acrylic conformal coating jobs take less time than other conformal coating jobs. With labor normally being the driving cost factor for most conformal coating applications, by limiting the amount of touch time involved, costs are reflective.

Acrylic conformal coating has great ease of use which allows for easy application and rework, low cost, and rapid turnaround. All of this plus its great physical properties make acrylic conformal coating an excellent choice for your next conformal coating project.

Common Applications of Acrylic Resin

- Gas meters
- LED assemblies
- Computer motherboards
- Power supplies
- Defibrillators
- Game cameras
- Other printed circuit boards

When not to use Acrylic conformal coating

While acrylic conformal coating does have its many benefits, there are some applications whenever it is not the ideal conformal coating to be using. Typically in applications that have exposure to solvents, high temperature requirements, or require coating hardness, acrylic conformal coating should not be used.

Solvent exposure

In applications that have an exposure to solvents, acrylic conformal coating is not the best choice. Acrylic conformal coating can be removed with a weaker solvent such as

isopropyl alcohol or xylene. Whenever it faces even stronger solvents, it will not offer the protection that is needed, especially if your product is a mission critical device. Other coatings, such as urethane or parylene have a far better resistance to solvents than acrylics.

High temperature requirements

For products that require a high temperature application, acrylic conformal coating will fall short of expectations. For HumiSeal 1B31, arguably the most popular acrylic coating, the max continuous operating temperature is 125ºC. Compare this to silicone conformal coating, whose operating temperature can exceed 200ºC. For higher temperature requirements, silicone conformal coating will perform at a level that acrylics cannot.

Coating hardness

For substrates that will face mechanical wear, acrylics will disappoint. While they do have a better mechanical wear resistance than silicones, acrylics fall behind urethane and epoxy conformal coating in this category.

Type AR Conformal Coating Examples

Type AR (acrylic resin) conformal coatings are a popular choice for conformal coating projects because of their moisture protection, low cost, and ease of application. There are many different varieties of type AR conformal coatings such as:

- MG Chemicals 419C
- HumiSeal 1B31
- HumiSeal 1B73
- HumiSeal 1B12
- HumiSeal 1B15
- HumiSeal 1B18
- HumiSeal 1B31 EPA
- Humiseal 1B31 LOC
- HumiSeal 1B66
- HumiSeal 1B73 EPA
- HumiSeal 1B73 LOC
- HumiSeal 1R32
- HumiSeal 1R32A-2
- Cytec Conap CE-1171
- Tech-Spray 2103-12S Fine-L-Kote
- Tech-Spray 2108-12S Turbo-Coat

- Electrolube HPA

About Diamond-MT

Diamond MT was founded in 2001 as a firm specializing in contract applications of Conformal Coatings for Department of Defense and Commercial Electronic Systems.

Since our beginning, Diamond MT has established a reputation for providing the highest quality services in the industry. Our commitment to quality, integrity and customer satisfaction combined with an unmatched expertise in applications and processes has provided every one of our customers with superior results.

Diamond MT operates out of a free standing 12,000 square foot building in Johnstown, Pennsylvania which is located 60 miles southeast of Pittsburgh. Diamond MT is located near three major interstates and is supported by the Cambria County Airport which serves as a primary freight terminal for south central Pennsylvania.

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