

Technical Data Sheet

MASTER BOND POLYMER SYSTEM UV15-7DC

One Component, UV and Heat Curable Polymer System for High Performance Bonding, Sealing, Coating and Encapsulation. Dual Cure System Allows for Curing in “Shadowed Out” Areas.

Product Description

Master Bond UV15-7DC is a one component, dual cure UV system for high performance bonding, sealing, coating and encapsulation applications. This system features a primary cure utilizing UV light and a secondary cure that requires heating for curing “shadowed out” sections that are not exposed to UV light. The heat required for polymerization is 250-300°F for 15-30 minutes. The UV part of the curing system is most often used for fixturing with the heat curing cycle being added to complete the cure.

UV15-7DC has superior physical strength properties, low shrinkage upon cure and good non-yellowing stability. It bonds well to a wide variety of substrates, including glass, metals and many high temperature plastics. This system has very good resistance to chemicals such as water, acids, bases and fuels. UV15-7DC offers excellent dimensional stability, superb electrical insulation properties and a very good capacity to withstand thermal cycling. It has a service temperature range of -80°F to +300°F.

UV15-7DC is 100% reactive and does not contain any solvents or other volatiles. The UV part of the cure is not oxygen inhibited and cures readily in 10-30 seconds when exposed to a UV light source emitting at a wavelength of 320-365 nm with an energy output as low as 20-40 milliwatts/cm². The rate of cure depends upon the compound’s distance from the light source, the thickness of the section and, of course, the intensity of the light source. As far as the heat curing mechanism, the elevated temperature must reach a minimum of 250°F, as mentioned above. Also, UV15-7DC can even be used for encapsulations up to 1/8 inch thick. However, when used in this manner, the heating should be ramped up slowly (over the course of 30-40 minutes). This system is widely used in optical, fiber-optic, electronic, laser, microelectronic and semiconductor applications.

Product Advantages

- One component system; no mixing required.
- Possesses a dual curing mechanism of UV light and heat.
- System capable of rapid fixturing with UV light and curing in “shadowed out” areas by heat.
- Bonds well to a wide variety of substrates.
- Excellent physical strength and electrical insulation properties.
- Can be used for potting up to 1/8 inch thick.

Typical Product Properties

- Color, 75°F transparent
- Viscosity, 75°F, cps 2,000-4,000
- Specific gravity, 75°F 1.10
- Hardness, Shore D, 75°F >70
- Tensile strength, 75°F, psi >5,000
- Tensile modulus, 75°F, psi >250,000
- Thermal expansion coefficient, 75°F, in/in x 10⁻⁶/°C 60-70
- Volume resistivity, 75°F, ohm-cm 1x10¹⁵
- Dielectric constant, 75°F, 60 Hz 3.5
- Linear shrinkage, 75°F 1-2%
- Refractive index, 75°F 1.55
- Service temperature range -80°F to +300°F
- Shelf life at 75°F, in original, unopened containers 6 months
- UV15-7DC is available in syringes, ½ pints, pints, quarts, gallons and 5 gallon containers.

Preparation of Compound and Surface

UV15-7DC is a single part system that requires no special mixing or heating. Realistically, for the UV portion of the cure one of the substrates to be bonded should be optically clear with no UV blocking agents so that the light penetrates the surface of the substrate. However, it should be noted that it is possible to bond two opaque surfaces with this system by UV fixturing from the side. In either case, the cure needs to be completed by adding heat. UV15-7DC cannot be used when plastics are sensitive to temperatures up to 250°F. All surfaces should be cleaned and where ever possible, roughened aggressively. Additionally, all substrates should be clean and free of oils, dirt, grease, etc. for proper adhesion.

Application and Assembly

Master Bond UV15-7DC, depending upon the viscosity, can be conveniently applied by brushing, rolling or troweling. For bonding applications, bond line thicknesses of 0.001-0.003 inches are more than adequate. Porous surfaces may require somewhat more adhesive to fill the voids than non-porous ones. The parts to be bonded should then be fixtured together with just enough pressure to maintain intimate contact during cure. The beauty of the system, from a processing standpoint, is that it requires no mixing, it's fast curing and fixturing time is minimal. Since Master Bond Polymer System UV15-7DC is 100% reactive and does not contain any solvents or diluents, shrinkage upon cure is minimal. When encapsulating, it may be necessary to vacuum degas to remove the relatively few air bubbles that might have been formed.

Cure

As previously noted, Master Bond UV15-7DC is formulated as a dual cure system. Depending upon the application, it can cure fully with UV light at a wavelength of 320-365 nm with an energy intensity of 20-40 milliwatts/cm² or it will fully cure at 125°C. More to the point, the product is most often used where the initial cure is performed by UV light and the secondary cure is by heat. One significant rationale for using this kind of system is to cure the system in areas where UV light is "shadowed out". Another is to reduce fixture time to the bare minimum by utilizing the UV portion of cure and then concluding it by adding heat. One can remove the excess adhesive with a spatula, then wipe with a rag and solvent such as acetone or xylene. When encapsulating, the system is cured by UV light and it is advisable to ramp up the heat gradually to cure in shadowed out areas.

Handling and Storage

All materials of this type should be used with good ventilation and skin contact should be avoided. For safe handling details, please consult the product MSDS. Optimum storage is at or below 75°F in closed containers. No special storage conditions are necessary. Containers should be kept closed when not in use to avoid contamination. The material should be kept in a dark area to avoid any accidental exposure to sunlight. Cleanup of spills and equipment is readily achieved with aromatic or ketone solvents employing proper precautions of ventilation and flammability.

Not to be used for specification purposes.

Master Bond Inc.

Adhesives, Sealants & Coatings

www.MasterBond.com • 154 Hobart Street • Hackensack, N.J. 07601-3922 • Tel: 201-343-8983 • Fax: 201-343-2132

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