

Technical Data Sheet

MASTER BOND POLYMER SYSTEM EP29LPSP

Two Component, Low Viscosity, Modified Heat Cured Epoxy System for Bonding, Sealing and Coating Formulated for Service at Cryogenic Temperatures and Capable of Withstanding Cryogenic Shock Meets NASA Requirements for Low Outgassing Applications

Product Description

Master Bond Polymer System EP29LPSP is a two component, high performance, modified low temperature heat cured epoxy system specially formulated for cryogenic applications. Not only is EP29LPSP able to function as an adhesive, sealant and protective coating at temperatures as low as 4°K, but it is also able to withstand cryogenic shocks (i.e. room temperature down to liquid helium temperatures in a 5-10 minute time period). This optically clear, low viscosity cryogenic epoxy bonds well to a wide variety of substrates including metals, glass, ceramics, and many different plastics. The working life is long; a 100 gram mass will allow over 90-120 minutes of working life. The EP29LPSP has superior electrical insulation properties and a good chemical resistance profile. EP29LPSP requires gelling the mixed epoxy at room temperature, followed by alternative lower elevated temperature cure cycles (8/10 hrs @ 130°/150°F) or (5/7 hrs @ 175°F) or (3/5 hrs @ 200°F). A thermally conductive version called EP29LPSPA0 is also available.

Product Advantages

- Exceptionally low mixed viscosity; contains no solvents or other volatiles.
- Long working life at ambient temperatures.
- Superior physical strength properties and thermal shock resistance.
- Excellent electrical insulation characteristics.
- High bonding strength to a wide variety of substrates.
- Good chemical resistance to water, fuels, acids, bases and salts.
- Excellent optical clarity.
- Low exotherm.
- Serviceable at cryogenic temperatures down to 4°K.
- Capable of withstanding cryogenic shocks.
- Available in premixed and frozen format

Product Properties

- Mixing ratio, part A to part B by weight 100/65
- Viscosity (cps) 75 Part A 10,000/16,000
- Viscosity (cps) 75 Part B 10/70
- Working life after mixing, 100 gram mass, 75°F..... > 120 minutes
- Cure schedule - Gel at room temp followed by any option listed below 1-2 hrs
- 130°-150°F..... 8-10 hrs
- 175°F 5-7 hrs
- 200°F 3-5 hrs
- Tensile shear strength (psi) Aluminum to Aluminum, 75°F >2200
- Tensile strength, 75°F, psi 6500
- Tensile elongation, 75°F, % 12
- Tensile modulus, 75°F, psi >375,000
- Thermal conductivity, 75°F, BTU•in/ft²•hr•°F 0.8
- Coefficient of thermal expansion, in/in x 10⁻⁶/°C 45
- Volume resistivity, 75°F, ohm-cm >10¹⁵

- Dielectric constant 3.9
- Hardness, Shore D ≥65
- Service temperature range, °F 4°K to +275°F
- Shelf life at 75°F, in unopened containers 6 months
- Available in premixed and frozen format (store @ -40°C).....6 months
- Parts A and B available in pint, quart, gallon and 5 gallon containers

Preparation of Compound and Bond Surfaces

Master Bond Polymer System EP29LPSP is prepared for use by thoroughly mixing part A with part B in a 100/65 mix ratio by weight. Mixing should be done slowly to avoid trapping air although the low compound viscosity facilitates air release. All mixing should be performed in a low humidity work environment to prevent moisture pickup. The working life of a mixed 100 gm batch is 90-120 minutes. It can be further lengthened by using shallow mixing vessels or mixing smaller size batches. All bonding surfaces should be carefully cleaned, degreased and dried to achieve maximum bond strength. When bonding to metal surfaces, chemical etching should be employed when the bonded joints are to exhibit optimal environmental durability. Nonporous surfaces should be roughened with sand paper or emery paper and solvent cleaned with acetone or xylene. Castings can be made using silicone rubber, plastic or metal molds using mold release agents for easy removal.

Application and Assembly

EP29LPSP is readily pourable for potting and casting applications. When bonding or sealing, apply EP29LPSP with a brush, paint roller or spatula. Enough mixed adhesive should be applied to obtain a final adhesive bond line thickness of 3-5 mils. This can be accomplished by coating one surface with an adhesive film 3-5 mils thick or by coating the two surfaces, each with a 1.5 to 2.5 mil thick layer of adhesive. Porous surfaces may require somewhat more adhesive to fill the voids than non-porous ones. Thicker glue lines do not increase the strength of a joint but do not necessarily give lower results as the EP29LPSP epoxy resin system does not contain any volatiles. The parts to be bonded should then be pressed together with just enough pressure to obtain and maintain intimate contact during cure.

Cure

Master Bond Polymer System EP29LPSP is a modified heat cured system; it requires that the mixed material gel at room temp for 1 to 2 hrs followed by any of the following options: 8-10 hrs @ 130°/150°F or 5-7 hrs @ 175°F or 3/5 hrs @ 200°F.

Handling and Storage

All epoxy resins should be used with good ventilation. Skin contact should be minimized. Master Bond Polymer System EP29LPSP employs a low toxicity-low skin irritation hardener. To remove resin or hardener from skin, use mild solvent, then wash with soap and water. If material enters the eyes, flood with water and consult a physician. Store in closed containers at 75°F in a low humidity environment to avoid contamination. Cleanup of spills and equipment can be accomplished using acetone or xylene, employing proper precautions of ventilation and flammability.

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