EP29LPSP Master Bond Polymer System

Two component epoxy compound for cryogenic applications

Key Features

- ✓ NASA low outgassing approved
- ✓ Optically clear
- ✓ Electrically insulative
- ✓ Serviceable at cryogenic temperatures down to 4K
- ✓ Withstands cryogenic shock
- ✓ Low mixed viscosity

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. EP29LPSP is serviceable at temperatures as low as 4K as an adhesive, sealant and protective coating, but more importantly, it is 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 epoxy bonds well to a wide variety of substrates including metals, glass, ceramics, composites and many different plastics. The working life is long; a 100 gram mass will allow over 4-5 hours of working life. 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 hours at 130-150°F) or (5-7 hours at 175°F) or (3-5 hours at 200°F). EP29LPSP is widely used in applications requiring cryogenic service, optical clarity and NASA low outgassing properties.

Product Advantages

- Exceptionally low mixed viscosity and low exotherm; contains no solvents or other volatiles
- Long working life at ambient temperatures
- Superior physical strength and electrical insulation properties
- High bonding strength to a wide variety of substrates
- Excellent chemical resistance to acids, bases and many solvents
- Outstanding track record for cryogenic serviceability

Typical Properties

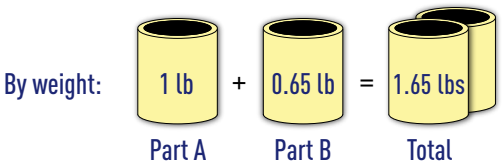
Tensile strength, 75°F	>8,000 psi
Tensile modulus, 75°F	>400,000 psi
Tensile lap shear strength, aluminum to aluminum, 75°F	>2,200 psi
Coefficient of thermal expansion	45-55 x 10^{-6} in/in/°C
Volume resistivity, 75°F	>10^{15} ohm-cm
Dielectric constant, 75°F, 60 Hz	3.95
Hardness, 75°F	>65 Shore D
Service temperature range	4K to +275°F [4K to +135°C]

Mixing and Curing

Shelf life at 75°F, in original, unopened containers	6 months
Mixing ratio, Parts A to B	100:65 by weight
Viscosity of Part A, 75°F	10,000-16,000 cps
Viscosity of Part B, 75°F	10-70 cps
Mixed viscosity of Part A and B, 75°F	500-1,500 cps
Working life after mixing at 75°F; 100 gram batch	>4-5 hours
Cure schedule - Gel at room temp followed by any option listed below	
130-150°F	8-10 hours
175°F	5-7 hours
200°F	3-5 hours

Preparation of Compound & 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 gram batch is 4-5 hours. 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, it is advisable to employ chemical etching to optimize adhesion. Nonporous surfaces should be roughened with sand paper or emery paper and solvent cleaned with acetone or xylene.

Application and Assembly

EP29LPSP is readily pourable for potting and casting applications. Castings can be made using silicone rubber, plastic or metal molds using mold release agents for easy removal. The system's low viscosity and long working life result in few air bubbles, but it still may be necessary to vacuum degas. When bonding or sealing, apply EP29LPSP with a brush, paint roller or spatula. For best results, a bond line thickness of 3-5 mils is required. 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 without squeezing out the epoxy.

Cure

Master Bond Polymer System EP29LPSP is a modified heat cured system. The optimum cure schedule requires that the mixed material gel at room temp for 5-6 hours followed by any of the following options: 8-10 hours at 130-150°F or 5-7 hours at 175°F or 3-5 hours at 200°F. All excess material should be removed promptly with a spatula or knife before it hardens. Clean residue with a rag and solvent using acetone, xylene, or toluene.

Packaging

Product available in:

- 1/2 Pint kits
- Pint kits
- Quart kits
- Gallon kits
- 5 Gallon kits

Also available in special packaging including premixed and frozen syringes.

Handling and Storage

All epoxy resins 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, however, be kept closed when not in use to avoid contamination. Cleanup of spills and equipment is readily achieved with aromatic or ketone solvents employing proper precautions of ventilation and flammability.

Certifications

NASA Low Outgassing

RoHS COMPLIANT

Not to Be Used for Specification Purposes

The values contained herein are considered typical properties only and are not intended to be used as specification limits. For assistance in preparing specifications, please contact Master Bond technical support for further details.

Notice

Master Bond believes the information on the data sheets is reliable and accurate as is technical advice provided by the company. Master Bond makes no warranties, expressed or implied, regarding the accuracy of the information, and assumes no liability regarding the handling and use of this product.