

# Technical Data Sheet

## MASTER BOND POLYMER ADHESIVE EP21AN

**Two Component Room Temperature Curing Epoxy Adhesive, Sealant and Coating Featuring a Convenient 1:1 Mix Ratio, Exceptionally High Thermal Conductivity, and Excellent Electrical Insulation Properties**

### Product Description

Master Bond Polymer Adhesive EP21AN is a two component room temperature curing adhesive, sealant and coating that has an exceptionally high thermal conductivity of over 22 BTU•in/ft<sup>2</sup>•hr•°F. It has an exceptionally forgiving 1:1 mix ratio by weight or volume. Accelerated cures are possible by adding heat. As a thermally conductive adhesive it will adhere to a wide variety of substrates and can offer a tensile shear strength over 1700 psi. Other noteworthy features included superior electrical insulation properties and enhanced dimensional stability. EP21AN offers superior resistance to a wide range of chemicals including water, oil, fuels, and some solvents over the temperature range of -60° to +250°F. A lower viscosity version called EP21ANLV is also available. The flowability of that system makes it an excellent thermally conductive potting compound. EP21AN-1 is a special formulation designed to meet NASA outgassing.

### Product Advantages

- Low coefficient of expansion, low shrinkage, superb dimensional stability.
- Convenient mixing: non-critical equal weight or volume ratio.
- Easy application: contact pressure only required for cure; adhesive spreads evenly; self leveling feature.
- Versatile cure schedules: ambient temperature cures or fast elevated temperature cures as required.
- High bonding strength to a wide variety of substrates.
- Superior durability, thermal shock and chemical resistance.
- Outstanding thermal conductivity, over 22 BTU•in/ft<sup>2</sup>•hr•°F. Excellent electrical insulation properties.

### Product Properties

- Mixing ratio, weight or volume, part A to B ..... 1/1
- Viscosity, mixed compound, 75°F, cps ..... Self leveling paste
- Working life after mixing, 75°F,
  - 200 gram mass, minutes ..... 90-120
  - quart mass, minutes ..... 60-75
- Cure schedule, room temperature:
  - 85% of maximum strength developed within ..... 48 hrs
- Bond strength, shear, aluminum/aluminum,
  - Room temperature cure, 75°F, psi ..... 1000
  - After 30 days water immersion, 75°F, psi ..... 900
- Thermal conductivity, BTU•in/ft<sup>2</sup>•hr•°F ..... 22
- Coefficient of thermal expansion, in/in x 10<sup>-6</sup>/°C ..... 22-25
- Dielectric strength, 75°F, volts/mil, (1/8" test specimen) ..... >400
- Volume resistivity, 75°F, ohm-cm ..... >10<sup>13</sup>
- Hardness, Shore D ..... >85
- Tensile strength, 75°F, psi ..... 5,000
- Tensile modulus, 75°F, psi ..... >500,000
- Service temperature range ..... -60°F to +250°F
- Shelf life at 75°F, in unopened containers ..... 6 months
- Parts A and B available in pint, quart, 1 (one) gallon and 5 (five) gallon containers.

### **Preparation of Adhesive and Bonding Surfaces**

Master Bond Polymer Adhesive EP21AN is prepared by thoroughly mixing part A with part B in a one-to-one mix ratio, weight or volume. Mixing should be done slowly to avoid entrapping air. Simply mix equal amounts of parts A and B by weight or volume and stir till color is uniform. The working life of a mixed 200 gram batch is approximately 90-120 minutes and that of one quart around 60-75 minutes. It can be substantially lengthened by using shallower mixing vessels or mixing smaller size batches. All bonding surfaces should be carefully cleaned, degreased and dried for obtaining maximum bond strengths. Also when bonding to metal surfaces, chemical etching should be employed when the bonded joints are to exhibit optimal environmental durability. Non-porous surfaces should be roughened with sandpaper or emery paper for hard materials.

### **Adhesive Application and Assembly**

Master Bond Polymer Adhesive EP21AN can be conveniently applied with a spatula, knife or trowel. Enough mixed adhesive should be applied to obtain a final adhesive bond line thickness of 4-6 mils thick or by coating the two surfaces, each with a 2-3 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 EP21AN adhesive 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 Adhesive EP21AN can be cured at room temperature or at elevated temperatures as desired. At room temperature, Master Bond Polymer Adhesive EP21AN develops 85% of its maximum bond strength within 48 hours. The bond strength increases continuously for about a week. Faster cures can be realized at elevated temperatures, e.g., 2 hours at 150°F, 60 minutes at 250°F or 40 minutes at 300°F for realizing about 80% of ultimate strength. The system continues to cure at room temperature for 2-3 days when full cure will be realized. Remove excess adhesive with a spatula promptly before it hardens, then wipe with a rag and solvent such as xylene, toluene or acetone. The thinner the section of epoxy, the slower the rate of cure.

### **Handling and Storage**

All epoxy resins should be used with good ventilation, also skin contact should be minimized. The EP21AN epoxy system employs a low toxicity 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 physician. 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 acetone or xylene employing proper precautions of ventilation and flammability.

## **Master Bond Inc.**

Adhesives, Sealants & Coatings • 154 Hobart Street • Hackensack, N.J. 07601-3922 • Tel: 201-343-8983  
Internet Address: <http://www.masterbond.com>

**→Notice:** Master Bond believes the information on the data sheets are 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 usage of this product. E21B7