

# EP21TCHT-1 Master Bond Polymer System

Two component epoxy compound for high performance bonding and sealing

## Key Features

- ✓ Thermally conductive, electrically insulative
- ✓ Cryogenically serviceable
- ✓ High temperature resistant
- ✓ Easy to apply, paste consistency
- ✓ NASA low outgassing approved
- ✓ Withstands 1,000 hours 85°C/85% RH

## Product Description

Master Bond EP21TCHT-1 is a two component, thermally conductive, heat resistant epoxy compound formulated to cure at ambient temperatures or more rapidly at elevated temperatures. EP21TCHT-1 has a 100:60 mix ratio by weight. Most significantly, it passes NASA low outgassing tests with exceptionally sterling numbers. EP21TCHT-1 offers an array of outstanding physical properties once cured. The system is an excellent, high strength adhesive that conducts heat, yet is electrically insulative. This epoxy can withstand rigorous thermal cycling and shocks. It is highly distinctive in that it possesses high temperature resistance as well as superlative cryogenic serviceability. Its actual service temperature range is from 4K to +400°F. It bonds well to a wide variety of substrates, including composites, metals, ceramics, glass and many rubbers and plastics. EP21TCHT-1 resists many chemicals including water, oils, fuels and many acids and bases. Its thermal expansion coefficient is

remarkably low, as indicated below. For an epoxy system, its dimensional stability is second to none. The color of Part A and Part B is off-white. EP21TCHT-1 is widely used in aerospace, electronics, electrical, semiconductor, and cryogenic applications. As a NASA qualified system, it is ideal for high vacuum type applications, particularly those where only slightly elevated temperature cures are possible. However, the best curing schedule to optimize properties is overnight at room temperature followed by 2 hours at 175-200°F.

## Product Advantages

- Easy to apply paste consistency
- Good thermal conductivity and electrical insulation
- NASA low outgassing
- Very low CTE
- Passes fungus resistance MIL-STD-810G

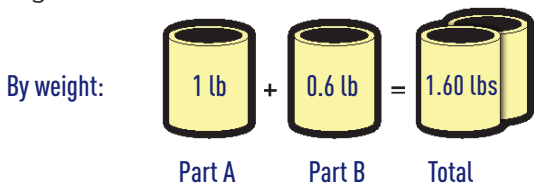
## Typical Properties

Tensile lap shear strength, aluminum to aluminum, 75°F	1,600-1,800 psi
Tensile strength, 75°F	8,000-9,000 psi
Tensile modulus, 75°F	600,000-650,000 psi
Compressive strength, 75°F	22,000-24,000 psi
Hardness, 75°F	85-95 Shore D
Hardness after 1,000 hours 85°C/85% RH	95 Shore D
Thermal conductivity, 75°F	10 BTU•in/(ft <sup>2</sup> •hr•°F) [1.4423 W/(m•K)]
Coefficient of thermal expansion, 75°F	18-21 x 10 <sup>-6</sup> in/in/°C
Volume resistivity, 75°F	>10 <sup>12</sup> ohm-cm
Dielectric strength, 75°F (1/8 inch thick test specimen)	450 volts/mil
Service temperature range	4K to +400°F [4K to +205°C]

## Mixing and Curing

Mixing ratio, Part A to B	100:60 by weight
Viscosity of Part A, 75°F	thixotropic paste
Viscosity of Part B, 75°F	40,000-90,000 cps
Mixed viscosity, 75°F	thixotropic paste
Working life after mixing, 75°F, 100 gram batch	30-60 minutes
Cure schedule, ambient temperatures	48-72 hours
Cure schedule, 200°F	2-3 hours
Optimum cure schedule, room temperature/200°F	overnight/1-2 hours
Shelf life at 75°F, in original, unopened containers	1 year in cans, 6 months in syringes

Prior to mixing in a 100 to sixty ratio by weight, the Part B should be gently stirred so that the filler is uniformly dispersed. Only then, should the A and B be mixed together.



Mixing should be done slowly to avoid entrapping air. The working life of a mixed 100 gram batch is approximately 30-60 minutes. It can be substantially lengthened by using shallower mixing vessels or mixing smaller size batches.

## Preparation of Bonding Surfaces

All bonding surfaces should be carefully cleaned, degreased and dried to obtain maximum bond strengths. 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

EP21TCHT-1 can be conveniently applied with a spatula, knife, or trowel. It is prepared for use by mixing the two components in the required 100:60 mix ratio by weight. Enough mixed adhesive should be applied to obtain a final adhesive bond line thickness of 2-4 mils thick. 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 EP21TCHT-1 does not contain any volatiles. The parts to be bonded should then be pressed together with just enough pressure to maintain intimate contact

during cure. Care should be taken not to squeeze out the adhesive during fixturing. EP21TCHT-1 can be cured at ambient or more quickly at elevated temperatures. Excess adhesive should be removed with solvents such as acetone, xylene or alcohol before it hardens.

## Cure

EP21TCHT-1 can be cured at room temperature or at elevated temperatures as desired. At room temperature, EP21TCHT-1 cures in 48-72 hours. Faster cures can be realized at elevated temperatures, e.g. 2-3 hours at 175-200°F. The recommended cure schedule to optimize product properties is overnight at room temperature followed by 2 hours at 175-200°F. The thinner the layer, the slower the rate of cure at room temperature.

## Packaging

Product available in:

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



EP21TCHT-1 is available in premixed and frozen syringes with a 6 month shelf life.

## 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 SDS. 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



**85°C / 85%RH**



### 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

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