

High Temperature Epoxy, Encapsulating & Potting Compound

Description

832HT potting and encapsulating compound is a general purpose, hard, black, two-part epoxy that offers extreme environmental, mechanical and physical protection for printed circuit boards and electronic assemblies.

This product is designed for high temperature applications and is especially useful when extreme physical strength and chemical resistance are required. It also provides excellent electrical insulation and protects components from static discharges, vibration, abrasion, thermal shock, environmental humidity, salt water, fungus, and many harsh chemicals.

832HT can be cured at room temperature or higher.

Features and Benefits

- *Suitable for very high temperature applications*
- *1.7A:1B volume mix ratio*
- *Extreme chemical resistance*
- *Extremely high compressive and tensile strength*
- *Excellent adhesion to a wide variety of substrates including metals, composites, glass, ceramics, and many plastics*
- *Excellent electrical insulating characteristics*
- *Very broad service temperature range -40 to 225 °C (-40 to 437 °F)*
- *Extreme resistance to water and humidity (allows for submersion where needed)*
- *Solvent-free*

Usage Parameters

Properties	Value
Working life @22 °C [72 °F]	1 h
Shelf life	5 y
Full cure @22 °C [72 °F]	24 h
Full cure @65 °C [149 °F]	1 h
Full cure @80 °C [176 °F]	To be determined
Full cure @100 °C [212 °F]	To be determined

Temperature Ranges

Properties	Value
Constant service temperature	-40 to 225 °C [-40 to 437 °F]
Maximum intermittent temperature ^{a)}	250 °C [482 °F]
Storage temperature of unmixed parts	16 to 27 °C [61 to 81 °F]

a) Temperature that can be withstood for short periods without sustaining damage.

Cured Properties

Physical Properties	Method	Value ^{a)}
Color	Visual	Black
Density @22 °C [72 °F]	ASTM D 792	1.10 g/mL
Hardness	Shore D Durometer	87D
Tensile strength	ASTM D 638	48 N/mm ² [7 000 lb/in ²]
Compressive strength	ASTM D 695	130 N/mm ² [19 100 lb/in ²]
Lap shear strength (aluminum)	ASTM D 1002	8.3 N/mm ² [1 200 lb/in ²]
Lap shear strength (brass)	ASTM D 1002	13 N/mm ² [1 900 lb/in ²]
Lap shear strength (copper)	ASTM D 1002	15 N/mm ² [2 100 lb/in ²]
Lap shear strength (stainless steel)	ASTM D 1002	15 N/mm ² [2 100 lb/in ²]
Flexural strength	ASTM D 790	101 N/mm ² [14 600 lb/in ²]
Flexural modulus	ASTM D 790	2 750 N/mm ² [399 000 lb/in ²]

Note: Specifications are for epoxy samples cured at 65 °C for 1 hour and conditioned at ambient temperature and humidity.

a) N/mm² = mPa; lb/in² = psi

Cured Properties

Electrical Properties	Method	Value
Breakdown voltage @2.7 mm	ASTM D 149	>50 000 V [>50 kV]
Dielectric strength @2.7 mm	ASTM D 149	>470 V/mil [>18 kV/mm]
Breakdown voltage @3.175 mm [1/8"]	Reference fit ^{a)}	>54 000 [>54 kV]
Dielectric strength @3.175 mm [1/8"]	Reference fit ^{a)}	>430 V/mil [>17 kV/mm]
Volume resistivity	ASTM D 257	$1 \times 10^{13} \Omega \cdot \text{cm}$
Volume conductivity	ASTM D 257	$1 \times 10^{-13} \text{ S/cm}$
Dielectric dissipation, D @1 kHz @10 kHz @1 MHz	ASTM D 150-98 ASTM D 150-98 ASTM D 150-98	0.007 0.011 0.014
Dielectric constant, k' @1 kHz @10 kHz @1 MHz	ASTM D 150-98 ASTM D 150-98 ASTM D 150-98	2.96 2.81 2.83
Insulating	—	Yes
Conductive	—	No

Note: Specifications are for epoxy samples cured at 65 °C for 1 hour and conditioned at ambient temperature and humidity.

a) To allow comparison between products, the dielectric strength was recalculated with the Tautscher equation fitted to 5 experimental values and extrapolated to a standard thickness of 1/8" (3.175 mm).

Thermal Properties	Method	Value
Glass transition temperature (T _g)	ASTM D 3418	89 °C [192 °F]
CTE ^{a)} prior T _g after T _g	ASTM E 831 ASTM E 831	86 ppm/°C [187 ppm/°F] 152 ppm/°C [306 ppm/°F]
Thermal conductivity @25 °C [77 °F]	ASTM E 1461	0.27 W/(m·K)
Specific heat @25 °C [77 °F]	ASTM E 1461	1.6 J/(g·K)
Thermal diffusivity @25 °C [77 °F]	ASTM E 1461	0.14 mm ² /s
Heat Deflection Temperature (HDT) ^{b)}	ASTM D 648	54 °C [129 °F]

Note: Specifications are for epoxy samples cured at 65 °C for 1 hour and conditioned at ambient temperature and humidity.

a) Coefficient of Thermal Expansion (CTE) units are in ppm/°C = in/in/°C × 10⁻⁶ = unit/unit/°C × 10⁻⁶

b) HDT of plastic under load of 264 lb/in²

Uncured Properties

Physical Properties	Mixture (A:B)
Color	Black
Viscosity @25 °C [77 °F]	21 900 cP [21.9 Pa·s] ^{c)}
Density	1.1 g/mL
Mix ratio by volume	1.7:1
Mix ratio by weight	2:1

c) Brookfield viscometer at 100 rpm with spindle RV S07

Physical Properties	Part A	Part B
Color	Black	Clear, amber tint
Viscosity @25 °C [77 °F]	46 400 cP [46.4 Pa·s] ^{d)}	6 600 cP [6.6 Pa·s] ^{d)}
Density	1.19 g/mL	0.96 g/mL
Odor	Mild	Musty

d) Brookfield viscometer at 12 rpm with spindle LV S64

Compatibility

Adhesion—As seen in the substrate adhesion table, 832HT epoxy adheres to most plastics and metals used to house printed circuit assemblies; however, it is not compatible with contaminants like water, oil, or greasy flux residues that may affect adhesion. If contamination is present, first clean the surface to be coated with MG Chemicals 824 Isopropyl Alcohol.

Storage

Store between 16 and 27 °C [61 and 81 °F] in a dry area, away from sunlight. Storage below 16 °C [61 °F] can result in crystallization.

If crystallization occurs, reconstitute the product to its original state by temporarily warming it to between 50 and 60 °C [122 and 140 °F]. To ensure full homogeneity, stir the warm product thoroughly. Make sure to reincorporate all settled material, close the lid, and then let cool before use.

Health and Safety

Please see the 832HT Safety Data Sheet (SDS) parts A and B for further details on transportation, storage, handling, safety guidelines, and regulatory compliance.

Substrate Adhesion (In Decreasing Order)

Physical Properties	Adhesion
Aluminum	Stronger
Steel	↑ ↓
Fiberglass	
Wood	
Paper, Fiber	
Glass	
Rubber	↓
Polycarbonate	
Acrylic	Weaker
Polypropylene	Does not bond

Application Instructions

For best results, follow the procedure below.

Manual mixing:

1. Scrape settled material free from the bottom and sides of the part A container; stir contents until homogenous.
2. Measure 1.7 parts by volume of the pre-stirred part A, and pour into the mixing container. Ensure all contents are transferred by scraping the container.
3. Measure 1 part by volume of the part B, and pour slowly into the mixing container while stirring. Ensure all contents are transferred by scraping the container.
4. Thoroughly mix parts A and B together.
5. Let sit for 15 minutes to de-air.
—OR—
Put in a vacuum chamber at 25 inHg for 2 minutes to de-air.
6. If bubbles are present at the top, break and stir them gently with the mixing paddle.
7. Pour the mixture into a container holding the components to be protected.
8. Close the part A and B containers tightly between uses to prevent skinning.

Attention!

Mixing >500 g at a time decreases working life and can lead to a flash cure. Limit the size of hand-mixed batches. For large production volumes, contact MG Chemicals Technical Support for assistance.

Cure Instructions

Room temperature cure:

- Let cure at room temperature for 24 hours.

Heat cure:

- Put in oven at 65 °C [149 °F] for 1 hour.

Attention!

Due to exothermic reaction, heat cure temperatures should be at least 25% below the maximum temperature the most fragile PCB component can tolerate. For larger potting blocks, reduce heat cure temperature by greater margins.

Packaging and Supporting Products

Cat. No.	Packaging	Net Volume	Packaged Weight
832HT-375ML	2 Bottle kit	340 mL [11.5 fl oz]	526 g [1.16 lb]
832HT-3L	3 Can kit	2.3 L [2.43 qt]	3.1 kg [6.83 lb]

Technical Support

Please contact us regarding any questions, suggestions for improvements, or problems with this product. Application notes, instructions and FAQs are located at www.mgchemicals.com.

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