

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.

832HT 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.

This epoxy has a convenient 2:1 weight mix ratio, making it compatible with most dispensing equipment. 832HT can be cured at room temperature or higher.

Benefits and Features

- **Suitable for very high temperature applications**
- **Convenient 2A:1B weight mix ratio**
- **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

<i>Properties</i>	<i>Value</i>
Working Time @22 °C [72 °F] ^{a)}	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]	45 min
Full Cure @100 °C [212 °F]	35 min
Full Cure @130 °C [266 °F]	25 min
Full Cure @160 °C [320 °F]	15 min
Full Cure @200 °C [392 °F]	10 min

a) Working time and full cure assumes room temperature and 100 g. A 10 °C increase can decrease the working time by half.

Temperature Ranges

<i>Properties</i>	<i>Value</i>
Constant Service Temperature	-40 to 225 °C [-40 to 437 °F]
Max Intermittent Temperature ^{b)}	250 °C [482 °F]
Storage Temperature of Unmixed Parts	16 to 27 °C [60 to 80 °F]

b) Temperature that components can withstand for short periods without sustaining damage.

Principal Components

Name	CAS Number
Part A: Novalac Bis F Epoxy Resin	28064-14-4
Part B: Curing polyamide	68410-23-1
Curing Amine	112-24-3

Properties of Cured 832HT

<i>Physical Properties</i>	<i>Method</i>	<i>Value</i> ^{a)}
Color	Visual	Black
Density @22 °C [72 °C]	ASTM D 792	1.1 g/cm ³
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]
<i>Electrical Properties</i>	<i>Method</i>	<i>Value</i>
Breakdown Voltage @2.7 mm	ASTM D 149	>50 kV
Dielectric Strength @2.7 mm	ASTM D 149	>18 kV/mm [>470 V/mil]
Breakdown Voltage @3.175 mm [1/8"]	Reference fit ^{b)}	>54 kV
Dielectric Strength @3.175 mm [1/8"]	Reference fit ^{b)}	>17 kV/mm [>430 V/mil]
Volume Resistivity	ASTM D 257	1 x 10 ¹³ Ω·cm
Dielectric Dissipation & Constant		<i>dissipation, D</i> <i>constant, k'</i>
@1 kHz	ASTM D 150-98	0.007 2.96
@10 kHz	ASTM D 150-98	0.011 2.81
@1 MHz	ASTM D 150-98	0.014 2.83
Insulating	—	Yes
Conductive	—	No

Note: Specifications are for epoxy samples cured at 65 °C for 1 hour, with additional curing time at room temperature for optimal results. For most tests, samples were conditioned at 23 °C and 50% RH.

a) N/mm² = mPa; lb/in² = psi;

b) To allow comparison between products, the Tautscher equation was fitted to 10 experimental dielectric strengths and interpolated for a standard reference thickness of 1/8" (3.175 mm).

Properties of Cured 832HT (Continued)


<i>Thermal Properties</i>	<i>Method</i>	<i>Value</i>
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
Glass Transition Temperature (T _g)	ASTM D 3418	89 °C [192 °F]
Coefficient of Thermal Expansion (CTE) ^{d)}	ASTM E 831	
Before T _g	ASTM E 831	86 ppm/°C
After T _g	ASTM E 831	152 ppm/°C
Heat Deflection Temperature ^{e)}	ASTM D 648	54 °C [129 °F]

TBD=To be determined

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

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

Properties of Uncured 832HT

<i>Physical Properties</i>	<i>Mixture</i>	
Color	Black	
Viscosity @25 °C [77 °F]	21 900 cP [21.9 Pa·s] ^{a)}	
Density	1.1 g/mL	
Mix Ratio by volume (A:B)	1.7:1.0	
Mix Ratio by weight (A:B)	2.0:1.0	
		
<i>Physical Properties</i>	<i>Part A</i>	<i>Part B</i>
Color	Black	Clear, amber tint
Viscosity @24°C [73 °F]	46 400 cP [46.4 Pa·s] ^{b)}	6 600 cP [6.6 Pa·s] ^{b)}
Density	1.19 g/mL	0.96 g/mL
Flash Point	150 °C [302 °F]	112 °C [252 °F]
% solids	~98%	100%
Odor	Mild	Musty


a) Brookfield viscometer at 100 RPM with spindle LV S07

b) 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, which may affect adhesion. In case of contamination, first clean the surface to be coated with MG Chemicals 824 Isopropyl Alcohol.

Substrate Adhesion in Decreasing Order

<i>Physical Properties</i>	<i>Adhesion</i>	
Aluminum	Stronger	
Steel		
Fiberglass		
Wood		
Paper, Fiber		
Glass		
Rubber		
Polycarbonate		
Acrylic		
Polypropylene ^{a)}		Weaker

a) Does not bond to polypropylene

Storage

Store between 16 and 27 °C [60 and 80 °F] in a dry area, away from sunlight. Prolonged storage, or storage at or near freezing temperatures, can result in crystallization.

If crystallization occurs, reconstitute the component 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 component thoroughly, reincorporating all settled material, then re-secure container lid and 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.

Application Instructions

For best results, follow the procedure below.

To prepare 1.7:1 (A:B) epoxy mixture:

- Scrape settled material free from the bottom and sides of **Part A** container; stir material until homogenous.
- Measure **1.7** parts by volume of the pre-stirred **A**, and pour into the mixing container.
- Measure **one** part by volume of the pre-stirred **B**, and pour slowly into the mixing container while stirring.
- Let sit for 15 minutes to de-air.
—OR—
Put in a vacuum chamber, bring to 25 inHg pressure, and wait for 2 minutes to de-air.
- If bubbles are present at the top, break them gently with the mixing paddle.
- Pour mixture into the mold or container holding the components to be encapsulated.
- Close container tightly between uses to prevent skinning.

ATTENTION! Mixing >500 g [0.4 L] of Part B at a time into A decreases working life and promotes flash cure. Use of epoxy mixing machines with static stirrers recommended for large volumes. Limit size of hand-mixed batches.

Room temperature cure:

- Let cure at room temperature for 24 hours.

Heat cure:

- Put in oven at 65 °C [149 °F] for 1 hour.
—OR—
- Put in oven at 80 °C [176 °F] for 45 minutes.
—OR—
- Put in oven at 100 °C [212 °F] for 35 minutes.
—OR—
- Put in oven at 130 °C [266 °F] for 25 minutes.
—OR—
- Put in oven at 160 °C [320 °F] for 15 minutes.
—OR—
- Put in oven at 200 °C [392 °F] for 10 minutes.

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.



832HT Technical Data Sheet

Epoxy Encapsulating & Potting Compound

ISO 9001:2008 Registered Quality System. Burlington, Ontario, CANADA SAI Global File: 004008

832HT

Packaging and Supporting Products

<i>Cat. No.</i>	<i>Packaging</i>	<i>Net Volume</i>		<i>Net Weight</i>		<i>Packaged Weight</i>	
832HT-375ML	Bottle	340 mL	11.5 fl oz	377 g	12.1 oz	526 g	1.16 lb
832HT-3L	Can	2.3 L	2.43 qt	2.55 kg	5.62 lb	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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