

### Description

832HD *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.

Due to its low mixed viscosity, 832HD can easily penetrate small gaps and cavities. 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 1:1 volume mix ratio, making it compatible with most dispensing equipment. 832HD can be cured at room temperature or higher.

### Benefits and Features

- **Convenient 1A:1B volume mix ratio**
- **Low mixed viscosity of 4 100 cP**
- **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**
- **Broad service temperature range -40 to 140 °C (-40 to 284 °F)**
- **Extreme resistance to water and humidity (allows for submersion where needed)**
- **Solvent-free**

### Usage Parameters

<i>Properties</i>	<i>Value</i>
Working Time @25 °C [77 °F] <sup>a)</sup>	45 min
Shelf Life	5 y
Full Cure @25 °C [77 °F]	24 h
Full Cure @65 °C [149 °F]	2 h
Full Cure @80 °C [176 °F]	1 h
Full Cure @100 °C [212 °F]	20 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 150 °C [-40 to 302 °F]
Intermittent Temperature Limit <sup>b)</sup>	-50 to 175 °C [-58 to 347 °F]
Storage Temperature of Unmixed Parts	16 to 27 °C [61 to 81 °F]

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

### Properties of Cured 832HD

<b>Physical Properties</b>	<b>Method</b>	<b>Value</b> <sup>a)</sup>
Color	Visual	Black
Density @25 °C [77 °F]	ASTM D 1475	1.07 g/cm <sup>3</sup>
Hardness	Shore D Durometer	80D
Tensile Strength	ASTM D 638	32 N/mm <sup>2</sup> [4 600 lb/in <sup>2</sup> ]
Young's Modulus	ASTM D 638	2.1 GPa [300 000 lb/in <sup>2</sup> ]
Compressive Strength	ASTM D 695	75 N/mm <sup>2</sup> [11 000 lb/in <sup>2</sup> ]
Lap Shear Strength (Stainless Steel)	ASTM D 1002	21 N/mm <sup>2</sup> [3 100 lb/in <sup>2</sup> ]
Lap Shear Strength (Aluminum)	ASTM D 1002	14 N/mm <sup>2</sup> [2 000 lb/in <sup>2</sup> ]
Lap Shear Strength (Copper)	ASTM D 1002	15 N/mm <sup>2</sup> [2 200 lb/in <sup>2</sup> ]
Lap Shear Strength (Brass)	ASTM D 1002	11 N/mm <sup>2</sup> [1 600 lb/in <sup>2</sup> ]
Lap Shear Strength (ABS)	ASTM D 1002	3.9 N/mm <sup>2</sup> [560 lb/in <sup>2</sup> ]
Lap Shear Strength (Polycarbonate)	ASTM D 1002	2.1 N/mm <sup>2</sup> [300 lb/in <sup>2</sup> ]
<b>Electrical Properties</b>	<b>Method</b>	<b>Value</b>
Breakdown Voltage @2.49 mm	ASTM D 149	41 700 V
Dielectric Strength @2.49 mm	ASTM D 149	400 V/mil 15.8 kV/mm
Breakdown Voltage @3.175 mm [1/8"]	Reference fit <sup>b)</sup>	45 700 V
Dielectric Strength @3.175 mm [1/8"]	Reference fit <sup>b)</sup>	365 V/mil 14.4 kV/mm
Volume Resistivity @2.41 mm	ASTM D 257	1.4 x 10 <sup>13</sup> Ω·cm
Dielectric Dissipation, D @1 MHz	ASTM D 150-11	0.041
Dielectric Constant, k' @1 MHz	ASTM D 150-11	2.53
<b>Thermal Properties</b>	<b>Method</b>	<b>Value</b>
Glass Transition Temperature (T <sub>g</sub> )	ASTM D 3418	41 °C [106 °F]
CTE <sup>c)</sup> prior T <sub>g</sub>	ASTM E 831	73 ppm/°C [41 ppm/°F]
after T <sub>g</sub>	ASTM E 831	207 ppm/°C [115 ppm/°F]
Thermal Conductivity @25 °C [77 °F]	ASTM E 1461 92	0.27 W/(m·K)
Thermal Diffusivity @25 °C [77 °F]	ASTM E 1461 92	0.12 mm <sup>2</sup> /s
Specific Heat Capacity @25 °C [77 °F]	ASTM E 1269 01	2.0 J/(g·K)

**Note:** Specifications are for epoxy samples cured at 80 °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/mm<sup>2</sup> = mPa; lb/in<sup>2</sup> = psi

b) To allow comparison between products, the Tautscher equation was fitted to 3 experimental dielectric strengths and extrapolated to a standard reference thickness of 1/8" (3.175 mm).

c) Coefficient of Thermal Expansion (CTE) units are in ppm/°C = in/in/°C × 10<sup>-6</sup> = unit/unit/°C × 10<sup>-6</sup>

### Properties of Uncured 832HD

<i>Physical Properties</i>	<i>Mixture</i>	
Color	Black	
Viscosity @25 °C [77 °F]	4 100 cP [4.1 Pa·s] <sup>a)</sup>	
Density	1.04 g/mL	
Mix Ratio by volume (A:B)	1:1	
Mix Ratio by weight (A:B)	1.22:1	
<i>Physical Properties</i>	<i>Part A</i>	<i>Part B</i>
Color	Black	Clear, amber
Viscosity @25 °C [77 °F]	5 900 cP [5.9 Pa·s] <sup>a)</sup>	2 300 cP [2.3 Pa·s] <sup>b)</sup>
Density	1.15 g/mL	0.95 g/mL
Odor	Mild	Ammonia-like


a) Brookfield viscometer at 100 rpm with spindle LVS64

b) Brookfield viscometer at 50 rpm with spindle LVS63

### Compatibility

**Adhesion**—As seen in the substrate adhesion table, the 832HD 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>
Steel	<p>Stronger</p>  <p>Weaker</p>
Aluminum	
Copper/Bronze	
Fiberglass	
Wood	
Paper, Fiber	
Glass	
Rubber	
Acrylic	
Polycarbonate	
Polypropylene <sup>a)</sup>	
Teflon <sup>a)</sup>	

a) Does not bond to polypropylene or Teflon

## 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 832HD **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 1:1 (A:B) epoxy mixture:

- Scrape settled material free from the bottom and sides of **Part A** container; stir material until homogenous.
- Measure **one** part 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 6 hours.  
—OR—
- Put in oven at 80 °C [176 °F] for 1 hour.  
—OR—
- Put in oven at 100 °C [212 °F] for 20 minutes.

### ATTENTION!

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

### Packaging and Supporting Products

<i>Cat. No.</i>	<i>Packaging</i>	<i>Dispensing Gun</i>	<i>Static Mixer</i>	<i>Net Volume</i>		<i>Packaged Weight</i>	
<b>832HD-25ML</b>	Dual Cartridge	N/Ap	8MT-25, 8MT-50	25 mL	0.8 fl oz	0.08 kg	0.18 lb
<b>832HD-50ML</b>	Dual Cartridge	8DG-50-1-1	8MT-25, 8MT-50	50 mL	1.6 fl oz	0.1 kg	0.23 lb
<b>832HD-400ML</b>	Dual Cartridge	8DG-400-1-1	8MT-450	400 mL	13.5 fl oz	0.62 kg	1.37 lb
<b>832HD-7.4L</b>	Can	N/Ap	N/Ap	7.4 L	1.9 gal	8.5 kg	18.7 lb
<b>832HD-40L</b>	Pail	N/Ap	N/Ap	40 L	10 gal	46.2 kg	102 lb

Note: TBD=To be determined, N/Ap=Not Applicable

### 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](http://www.mgchemicals.com).

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