

Description

The 832HD *1:1 Epoxy Potting and Encapsulating Compound* is a two-part, economical, flowable, electronic-grade epoxy that provides excellent physical, chemical, and electrical protection. It is very easy to use due its 1:1 mix ratio and because it is room temperature curable. In its cured state, it protects electronic assemblies against corrosion, static discharges, shocks, vibrations, and mechanical impacts. Further, it is extremely resistant harsh environments with salt water, harsh chemicals, and high humidity. Because it is opaque and extremely tough, it helps protect printed circuit board intellectual property by forming a hard to penetrate barrier.

Applications & Usages

The 832HD epoxy is used to pot or encapsulate printed circuit assemblies in a protective block. The cured epoxy improves reliability, operational range, and lengthens the life of electrical and electronic parts.

Benefits and Features

- **Non-corrosive**
- **Flowable and high durability**
- **Very high tensile and compressive strength**
- **Easy mix ratio 1A:1B by volume**
- **Protects electronics from** moisture, humidity, corrosion, fungus, and static discharges
- **Free of solvents**

ENVIRONMENT

- ✓ RoHS
- ✓ REACH compliant

Usage Parameters

<i>Properties</i>	<i>Value</i>
Working Life @25 °C [77 °F] ^{a)}	45 min
Shelf Life	5 y
Full Cure @25 °C [77 °F]	24 h
Full Cure @65 °C [149 °F]	6 h
Full Cure @80 °C [176 °F]	1 h
Full Cure @100 °C [212 °F]	20 min

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

Temperature Ranges

<i>Properties</i>	<i>Value</i>
Constant Service Temperature	-40 to 150 °C [-40 to 302 °F]
Intermittent Temperature Limits ^{b)}	-50 to 175 °C [-58 to 347 °F]
Storage Temperature of Unmixed Parts	16 to 27 °C [61 to 81 °F]

b) Short-term exposure temperature toleration limit—not recommended as a sustained or repeated operation condition.

Properties of Cured 832HD

<i>Physical Properties</i>	<i>Method</i>	<i>Value</i> ^{a)}
Color	Visual	Black
Density @25 °C [77 °F]	ASTM D 1475	1.07 g/cm ³
Hardness	Shore D	80D
Tensile Strength	ASTM D 638	32 N/mm ² [4 600 lb/in ²]
Young's Modulus	"	2.1 GPa [300 000 lb/in ²]
Compressive Strength	ASTM D 695	75 N/mm ² [11 000 lb/in ²]
Lap Shear Strength (Stainless Steel)	ASTM D 1002	21 N/mm ² [3 100 lb/in ²]
Lap Shear Strength (Aluminum)	"	14 N/mm ² [2 000 lb/in ²]
Lap Shear Strength (Copper)	"	15 N/mm ² [2 200 lb/in ²]
Lap Shear Strength (Brass)	"	11 N/mm ² [1 600 lb/in ²]
Lap Shear Strength (ABS)	"	3.9 N/mm ² [560 lb/in ²]
Lap Shear Strength (Polycarbonate)	"	2.1 N/mm ² [300 lb/in ²]
<i>Electric Properties</i>	<i>Method</i>	<i>Value</i>
Breakdown Voltage @2.49 mm	ASTM D 149	41 700 V
Dielectric Strength	"	400 V/mil 15.8 kV/mm
Breakdown Voltage @3.175 mm [1/8"]	Reference fit ^{a)}	45 700 V
Dielectric Strength	"	365 V/mil 14.4 kV/mm
Volume Resistivity @2.41 mm	ASTM D 257	1.4 x 10 ¹³ Ω·cm
<i>Thermal Properties</i>	<i>Method</i>	<i>Value</i>
Glass Transition Temperature (T _g)	ASTM D 3418	41 °C [106 °F]
CTE ^{c)} prior T _g	ASTM E 831	73 ppm/°C [41 ppm/°F]
after T _g	"	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]	"	0.12 mm ² /s
Specific Heat Capacity @25 °C [77 °F]	ASTM E 1269 01	2.03 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/mm² = mPa; lb/in² = 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 × 10⁻⁶ = unit/unit/°C × 10⁻⁶

Properties of Uncured 832HD

<i>Physical Property</i>	<i>Mixture (1A:1B)</i>	
Color	Black	
Viscosity @25 °C [77 °F]	4 100 cP [4.1 Pa·s] ^{a)}	
Density	1.04 g/mL	
Mix Ratio by volume (A:B)	1:1	
Mix Ratio by weight (A:B)	1.22:1	
<i>Physical Property</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] ^{a)}	2 300 cP [2.3 Pa·s] ^{b)}
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 materials found on printed circuit assemblies; however, it is not compatible with contaminants like water, oil, and greasy flux residues that may affect adhesion. If contamination is present, clean the printed circuit assembly with electronic cleaner such as MG Chemicals 4050 Safety Wash, 406B Superwash, or 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 ^{a)}	
Teflon ^{a)}	

a) Does not bond to polypropylene or Teflon

Storage

Store between 16 and 27 °C [60 and 80 °F] in 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 50 to 60 °C [122 to 140 °F]. To ensure full homogeneity, stir thoroughly the warm component, reincorporating all settled material. Re-secure container lid and let cool down before use.

Health and Safety

Please see the 832HD **Safety Data Sheet** (SDS) parts A and B for more details on transportation, storage, handling and other security guidelines.

Wear safety glasses or goggles and disposable polyvinyl chloride, neoprene, or nitrile gloves while handling liquids. Part B in particular causes skin burns and may cause sensitization if exposed over a long period of time. The epoxy is black and will not wash off once cured: wear protective work clothing. Wash hands thoroughly after use or if skin contact occurs. Do not ingest.

Use in well-ventilated area since vapors may cause irritation of the respiratory tract and cause respiratory sensitization in susceptible individuals.

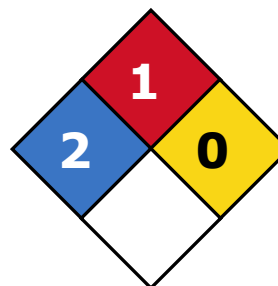
The cured epoxy resin presents no known hazard.

Part A

HMIS® RATING

HEALTH:	* 2
FLAMMABILITY:	1
PHYSICAL HAZARD:	0
PERSONAL PROTECTION:	

NFPA® 704 CODES

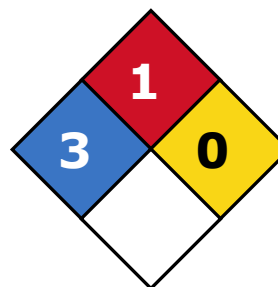


Part B

HMIS® RATING

HEALTH:	* 3
FLAMMABILITY:	1
PHYSICAL HAZARD:	0
PERSONAL PROTECTION:	

NFPA® 704 CODES



Application Instructions

Follow the procedure below for best results. If you have little or no experience with the 832HD epoxy, please follow the long instructions instead. The short instructions provided here are not suitable for first time users.

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

- Scrape any settled material in the **Part A** container; and stir and fold material until homogenous.
- Scrape any settled material in the **Part B** container; and stir and fold material until homogenous.
- Measure **one** part by volume of the pre-stirred **A**, and pour in the mixing container.
- Measure **one** part by volume of the pre-stirred **B**, and slowly pour in the mixing container while stirring.
- Let sit for 30 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 top, use the mixing paddle to gently break them.
- Pour mixture into the mold or container containing the components to be encapsulated.

ATTENTION! If the parts have clumped (crystallized), pre-heat at 50 °C [122 °F] until fully re-liquefied. Let cool to room temperature before use.

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 stirrer recommended for large volumes. Limit size of hand-mixed batches.

To heat cure the 832HD epoxy

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 [176 °F] for 20 minutes.

ATTENTION: Keep the curing temperature well below temperature limit of heat sensitive components that may be present. As a guideline, remember that commercial grade devices normally can be safely operated up to 70 °C, industrial grade up to 85 °C, and military grade up to 175 °C.

ATTENTION: Heat guns can easily exceed the temperature limits for your assembly: they should not be used.

To room temperature cure the 832HD epoxy

Let stand for 24 hours.

TIP: While the product can be cured at room temperature, better performance is achieved with heat curing.



ISO 9001 Registered Quality System.
Burlington, Ontario, Canada QMI File # 004008

1:1 Epoxy Potting and Encapsulating Compound 832HD Technical Data Sheet

832HD

Packaging and Supporting Products

<i>Cat. No.</i>	<i>Packaging</i>	<i>Net Volume</i>		<i>Net Weight</i>		<i>Shipping Weight</i>	
832HD-25ML	Dual Cartridge	25 mL	0.8 fl oz	26.2 g	0.92 oz	TBD	TBD
832HD-50ML	Dual Cartridge	50 mL	1.6 fl oz	52.5 g	1.85 oz	"	"
832HD-400ML	Dual Cartridge	400 mL	13.5 fl oz	420 g	14.8 oz	"	"
832HD-7.4L	Can	7.4 L	1.9 gal	7.77 kg	17.1 lb	"	"
832HD-40L	Pail	40 L	10 gal	42 kg	92 lb	"	"

Note: TBD stands for to be determined.

Supporting Products

- *Epoxy and Adhesive Cleaner*: Cat. No. 8328-500ML, 8328-20L
- *Epoxy Mold Release (for temperature cures ≤ 85 °C)*: Cat. No. 8329-350G

Technical Support

Contact us regarding any questions, improvement suggestions, or problems with this product. Application notes, instructions, and FAQs are located at www.mgchemicals.com.

Email: support@mgchemicals.com

Phone: +(1) 800-340-0772 (Canada, Mexico & USA)

+ (1) 905-331-1396 (International)

Fax: +(1) 905-331-2862 or +(1) 800-340-0773

Mailing address: **Manufacturing & Support**
1210 Corporate Drive
Burlington, Ontario, Canada
L7L 5R6

Head Office
9347-193rd Street
Surrey, British Columbia, Canada
V4N 4E7

Warranty

M.G. Chemicals Ltd. warrants this product for 12 months from the date of purchase by the end user. *M.G. Chemicals Ltd.* makes no claims as to shelf life of this product for the warranty. The liability of *M.G. Chemicals Ltd.* whether based on its warranty, contracts, or otherwise shall in no case include incidental or consequential damage.

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