

Description

The 832FX *Black Flexible Epoxy Encapsulating and Potting Compound* is an economical, electronic-grade, two-part system that is flowable. Its cured form is flexible offering excellent physical, chemical, and electrical protection, and providing some small amount of thermal conductivity.

It protects against static discharges, thermal shocks, vibrations, and mechanical impacts. It is extremely resistant to environmental humidity, salt water, and harsh chemicals. It also hides and restrict access to intellectual property by being much harder to remove than standard epoxy encapsulating compounds.

Applications & Usages

The 832FX flexible 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

- **Flexible and high durability**
- **Mix ratio 1A:1B** compatible with most dispensing equipment
- **Resistance to water and humidity**
- **Protects electronics from** moisture, corrosion, fungus, thermal shock, and static discharges
- **Flowable and free of solvent parts**

ENVIRONMENT

- ✓ RoHS
- ✓ REACH compliant

Usage Parameters

<i>Properties</i>	<i>Value</i>
Working Life @25 °C [77 °F] ^{a)}	2.5 h
Shelf Life	5 y
Full Cure @25 °C [77 °F]	48 h
Full Cure @45 °C [113 °F]	5 h
Full Cure @65 °C [149 °F]	2 h
Full Cure @80 °C [176 °F]	1.5 h
Full Cure @100 °C [212 °F]	50 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 140 °C [-40 to 284 °F]
Intermittent Temperature Extrema ^{b)}	-50 to 150 °C [-58 to 302 °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 832FX

<i>Physical Properties</i>	<i>Method</i>	<i>Value</i> ^{a)}
Color	Visual	Black
Density @25 °C [77 °F]	ASTM D 1475	1.08 g/mL
Hardness	Shore A	88A
Tensile Strength	ASTM D 638	1.77 N/mm ² [257 lb/in ²]
<i>Electric Properties</i>	<i>Method</i>	<i>Value</i>
Breakdown Voltage @2.33 mm	ASTM D 149	36 300 V
Dielectric Strength	"	400 V/mil 15.7 kV/mm
Breakdown Voltage @3.175 mm [1/8"]	Reference fit ^{a)}	42 800 V
Dielectric Strength	"	343 V/mil 13.5 kV/mm
Volume Resistivity @2.41 mm	ASTM D 257	5.8 x 10 ¹² Ω·cm
<i>Thermal Properties</i>	<i>Method</i>	<i>Value</i>
Glass Transition Temperature (T _g)	ASTM D 3418	8.8 °C
CTE ^{c)} prior T _g	ASTM E 831	114 ppm/°C
after T _g	"	218 ppm/°C
Thermal Conductivity @25 °C [77 °F]	ASTM E 1461 92	0.26 W/(m·K)
Thermal Diffusivity @25 °C [77 °F]	"	0.09 mm ² /s
Specific Heat Capacity @25 °C [77 °F]	ASTM E 1269 01	2.69 J/(g·K)

Note: Specifications are for epoxy samples cured at 65 °C for 2 hours, 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 832FX

<i>Physical Property</i>	<i>Mixture (1A:1B)</i>	
Color	Black	
Viscosity @25 °C [77 °F]	700 cP [0.700 Pa·s] ^{a)}	
Density	1.06 g/mL	
Mix Ratio by weight (A:B)	100:85	
Mix Ratio by volume (A:B)	1:1	
<i>Physical Property</i>	<i>Part A</i>	<i>Part B</i>
Color	Black	Clear, amber
Viscosity @25 °C [77 °F]	800 cP [0.800 Pa·s] ^{a)}	165 cP [0.165 Pa·s] ^{b)}
Density	1.13 g/mL	0.98 g/mL
Odor	Mild	Ammonia-like


a) Brookfield viscometer at 30 RPM with spindle LVS62

b) Brookfield viscometer at 30 RPM with spindle LVS61

Compatibility

Adhesion—As seen in the substrate adhesion table, the 832FX 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	Stronger
Aluminum	
Copper/Bronze	
Fiberglass	
Wood	
Paper, Fiber	
Glass	
Rubber	
Acrylic	
Polycarbonate	
Polypropylene ^{a)}	
Teflon ^{a)}	Weaker

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

The 832FX parts can ignite if the liquid is both heated and exposed to flames or sparks.

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 to susceptible individuals.

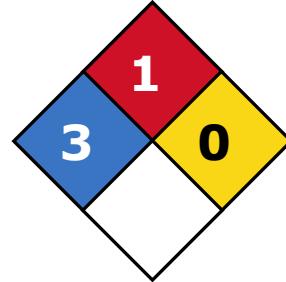
The cured epoxy resin presents no known hazard.

Part A

HMIS® RATING

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

NFPA® 704 CODES

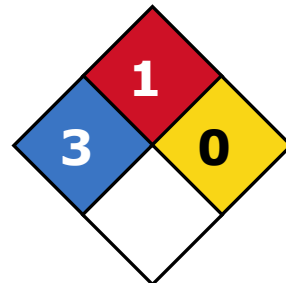


Part B

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 832FX 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 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 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.



Black Flexible Epoxy Encapsulating and Potting Compound 832FX Technical Data Sheet

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

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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.

TIP! Close container tightly between uses to prevent skinning.

To room temperature cure the 832FX epoxy

- Let cure at room temperature for 48 hours.

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

Product Availability

<i>Cat. No.</i>	<i>Packaging</i>	<i>Net Volume</i>		<i>Net Weight</i>		<i>Shipping Weight</i>	
832FX-450ML	Bottle	450 mL	15.2 fl oz	475 g	1.05 lb	TBD	TBD
832FX-1.7L	Can	1.7 L	57 fl oz	1.8 kg	3.9 lb	"	"
832FX-7.4L	Pail	7.4 L	1.9 gal	7.82 kg	17.2 lb	"	"
832FX-40L	Pail	40 L	10 gal	42.2 kg	93.2 lb	"	"

Note: TBD=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



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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.

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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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