Description

832FX *potting and encapsulating compound* is a flexible, black, two-part epoxy that offers extreme environmental, mechanical and physical protection for printed circuit boards and electronic assemblies.

832FX is designed for applications where minimizing the physical stress on components is critical. It is also good in low temperature and arctic environments, as well as applications that involve temperature cycling or rapid temperature changes. It provides the functionality of silicone, but with the durability and cost-effectiveness of epoxy.

Due to its very low mixed viscosity, it 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. 832FX can be cured at room temperature or higher.

Benefits and Features

- **Flexible**
- **Convenient 1A:1B volume mix ratio**
- **Very low mixed viscosity of 700 cP**
- **High elongation**
- **Good adhesion to a wide variety of substrates including metals, composites, glass, ceramics, and many plastics**
- **Excellent electrical insulating characteristics**
- **Extreme resistance to water and humidity (allows for submersion where needed)**
- **Solvent-free**

Usage Parameters

Properties	*Value*
Working Time @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 time and full cure assumes room temperature and 100 g. A 10 °C increase can decrease the working time by half.

Temperature Ranges

Properties	*Value*
Constant Service Temperature	-40 to 140 °C [-40 to 284 °F]
Intermittent Temperature Limit [b)]	-50 to 150 °C [-58 to 302 °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 832FX

Physical Properties	***Method***	***Value*** [a]
Color	Visual	Black
Density @25 °C [77 °F]	ASTM D 1475	1.08 g/mL
Hardness	Shore A Durometer	88A
Tensile Strength	ASTM D 638	9.6 N/mm^2 [1 400 lb/in^2]
Elongation %	ASTM D 638	160%
Electrical Properties	***Method***	***Value***
Breakdown Voltage @2.33 mm	ASTM D 149	36 300 V
Dielectric Strength @2.33 mm	ASTM D 149	400 V/mil 15.7 kV/mm
Breakdown Voltage @3.175 mm [1/8”]	Reference fit [a]	42 800 V
Dielectric Strength @3.175 mm [1/8”]	Reference fit [a]	343 V/mil 13.5 kV/mm
Volume Resistivity @2.41 mm	ASTM D 257	5.8 x 10^{12} Ω·cm
Dielectric Dissipation, D @1 MHz	ASTM D 150-11	0.050
Dielectric Constant, k’ @1 MHz	ASTM D 150-11	3.06
Thermal Properties	***Method***	***Value***
Glass Transition Temperature (T_g)	ASTM D 3418	8.8 °C [48 °F]
CTE [c] prior T_g	ASTM E 831	114 ppm/°C
after T_g	ASTM E 831	218 ppm/°C
Thermal Conductivity @25 °C [77 °F]	ASTM E 1461 92	0.26 W/(m·K)
Thermal Diffusivity @25 °C [77 °F]	ASTM E 1461 92	0.09 mm^2/s
Specific Heat Capacity @25 °C [77 °F]	ASTM E 1269 01	2.7 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/mm^2 = mPa; lb/in^2 = 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

Physical Properties	*Mixture*
Color	Black
Viscosity @25 °C [77 °F]	700 cP [0.700 Pa·s] a)
Density	1.06 g/mL
Mix Ratio by volume (A:B)	1:1
Mix Ratio by weight (A:B)	100:85

Physical Properties	*Part A*	*Part B*
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, 832FX 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

Physical Properties	*Adhesion*
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 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 832FX **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 48 hours.

Heat cure:

- Put in oven at 45 °C [113 °F] for 5 hours.
  –OR–
- Put in oven at 65 °C [149 °F] for 2 hours.
  –OR–
- Put in oven at 80 °C [176 °F] for 1.5 hours.
  –OR–
- Put in oven at 100 °C [212 °F] for 50 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.

Packaging and Supporting Products

Cat. No.	*Packaging*	*Net Volume*		*Net Weight*		*Packaged Weight*	
832FX-450ML	Bottle	450 mL	15.2 fl oz	475 g	1.05 lb	0.68 kg	1.5 lb
832FX-1.7L	Can	1.7 L	57 fl oz	1.8 kg	3.9 lb	2.23 kg	5 lb
832FX-7.4L	Pail	7.4 L	1.9 gal	7.82 kg	17.2 lb	TBD	
832FX-40L	Pail	40 L	10 gal	42.2 kg	93.2 lb	TBD	

TBD=to be determined

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.

Email: support@mgchemicals.com

Phone: +(1) 800-340-0772 (Canada, Mexico & USA)
+(1) 905-331-1396 (International)
+(44) 1663 362888 (UK & Europe)
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

Disclaimer

This information is believed to be accurate. It is intended for professional end users who have the skills required to evaluate and use the data properly. *M.G. Chemicals Ltd.* does not guarantee the accuracy of the data and assumes no liability in connection with damages incurred while using it.