Translucent Epoxy Encapsulating & Potting Compound 832C Technical Data Sheet

Description

The 832C Translucent Epoxy Encapsulating and Potting Compound is an electric grade epoxy. It is simple to mix and easy to use. This two parts clear epoxy provides great insulation and protection value.

It protects against static discharges, shocks, vibrations, and mechanical impacts. It insulates against heat and conductivity. It is extremely resistant to environmental humidity, salt water, and many harsh chemicals.

Applications & Usages

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

Its primary applications are in the automobile, marine, aerospace, aviation, communication, instrumentation, and industrial control equipment.

Benefits

- **Extreme impact resistance** (contains a form of nylon)
- **Extreme resistance to water and humidity** allowing submersion if needed
- **Strong chemical resistance** to brine, acids, bases, and aliphatic hydrocarbons
- **Good protection of electronics against** corrosion, fungus, thermal shock, and static discharges
- **Easy 2A:1B mix ratio** compatible with most dispensing equipment
- **Negligible Volatile Organic Content (VOC)**

Curing & Work Schedule[a]

Properties	*Value*
Working Life	60 minute
Shelf Life	≥3 year
Full Cure (at 20 °C [68 °F])	24 hour
Full Cure (at 65 °C [149 °F])	60 minute
Full Cure (at 80 °C [176 °F])	45 minute
Full Cure (at 100 °C [212 °F])	35 minute
Storage Temperature of Unmixed Parts	16 to 27 °C [60 to 80 °F]

a) Working life assumes room temperature. A 10 °C increase can decreases the pot life by half.

Temperature Service Ranges

Properties	*Value*
Constant Service Temp.	-30 °C to 140 °C [-22 to 284 °F]
Service Temperature[b]	<-30 | +145 °C [<-22 | +294 °F]

b) The service temperature provides temperature extremes that can be withstood for short periods of time only.

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Principal Components

Name	***CAS Number***
Part A: Bis-A Epoxide Resin	*25068-38-6*
Alkyl Glycidyl Ether Epoxide Resin	*68609-97-2*
Part B: Curing Polyamide	*68082-29-1*
Curing Aliphatic amine	*112-24-3*

Properties of Cured 832C

Physical Properties	***Method***	***Value***[a]
Color	Visual	Translucent, yellow
Density (at 26 °C)	ASTM D 792	1.12 g/cm^3
Hardness	(Shore D durometer)	85D
Tensile Strength	ASTM D 638	55.7 N/mm^2 [8,080 lb/in^2]
Elongation	"	6.4%
Lap Shear Strength	ASTM D 1002	4.42 N/mm^2 [641 lb/in^2]
Izod Impact[b]	ASTM D 256	1.47 kJ/m^2 [0.700 ft·lb/in]
Compression Strength	ASTM D 695	182 N/mm^2 [26,500 lb/in^2]
Modulus	"	2170 N/mm^2 [315,000 lb/in^2]
Flexural Strength	ASTM D 790	38.26 N/mm^2 [5,549 lb/in^2]
Modulus	"	2551 N/mm^2 [370,000 lb/in^2]

Electric Properties	***Method***	***Value***
Breakdown Voltage @0.114”	ASTM D 149	48.5 kV @ avg. of 2.90 mm
Dielectric Strength	"	425 V/mil [16.7 kV/mm]
Breakdown Voltage @1/8”	calculated[c]	50.7 kV @ 3.175 mm
Dielectric Strength	"	406 V/mil [15.7 kV/mm]
Volume Resistivity	ASTM D 257	1.22 x10^{16} Ω·cm
Surface Resistivity[d]	"	5.50 x10^{15} Ω
Dielectric Constant, k’ @60 Hz	ASTM D 150	3.85
@1 kHz	"	3.19
@1 MHz	"	2.99

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/mm^2 = mPa; lb/in^2 = psi;

b) Sample thickness 0.214”

c) To allow comparison between products, the Tautschter equation was used to get the dielectric strength and breakdown voltage for a standard reference thickness of 1/8” (3.175 mm).

d) The surface (sheet) resistivity unit is commonly referred to as “Ohm per square”

Properties of Cured 832C (*Continued*)

Thermal Properties	*Method*	*Value*
Coefficient of Thermal Expansion (CTE)[e]	ASTM E 831	72 ppm/°C [f]
Heat Deflection Temperature (HDT)[g]	ASTM D 648	43.548 °C [92.22 °F]

e) Coefficient of Thermal Expansion (CTE) units are in ppm/°C = in/in/°C × 10^{-6} = unit/unit/°C × 10^{-6}
f) Temperature range is from 0 to 22 °C [32 to 72 °F]
g) HDT under a 1820 kPa [264 lb/in2] load

Properties of Uncured 832C

Physical Property	*Mixture (2A:1B)*
Color	Translucent, Amber Tint
Viscosity[a] at 20 °C [73 °F]	3,300 cP [3.3 Pa·s]
Density	1.058 g/mL
Mix Ratio by volume (A:B)	2.0:1.0
Mix Ratio by weight (A:B)	2.3:1.0
Solids Content (w/w)	100%

Physical Property	*Part A*	*Part B*
Color	Translucent, Amber Tint	Clear, Amber Tint
Viscosity* at 24°C [73 °F]	2,500 cP [2.5 Pa·s]	11,000 cP [11.0 Pa·s]
Density	1.127 g/mL	0.967 g/mL
Flash Point	154 °C [309 °F]	110 °C [230 °F]
Odor	Mild	Musty

a) Brookfield viscometer at 50 RPM with spindle LV4

Compatibility

Adhesion—As seen in the substrate adhesion table, the 832C 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

Physical Properties	*Adhesion*
Aluminum	Stronger
Steel	↓
Fiberglass	
Wood	
Glass	
Polycarbonate	
Acrylic	
Polypropylene[a]	Weaker

a) Does not bond to polypropylene

Chemical Resistance—The chemical solvent resistance table presents the percent weight change over the indicated period. The results show low water absorption and a high chemical resistance to water and most ionic species. Softening and swelling occurs for aggressive organic solvents.

Chemical Solvent Resistance

Physical Properties	*Weight Change 3 days*	*Weight Change 45 days*
Water	< 0.0 %	< 1%
Hydrochloric Acid	< 0.0 %	< 1%
Isopropyl alcohol	0.3%	< 1%
Mineral spirits	0.3 %	0.3 %
Xylene	2 %	9 %
Ethyl Lactate	3 %	7 %
Iso hexanes	5 %	8%
Acetone	7 %	destroyed

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.

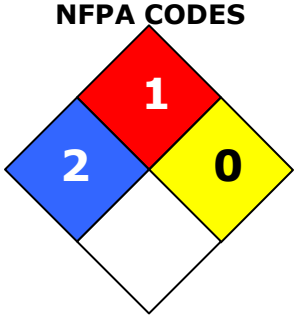
Health and Safety

Part A

HMIS RATING

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

NFPA CODES

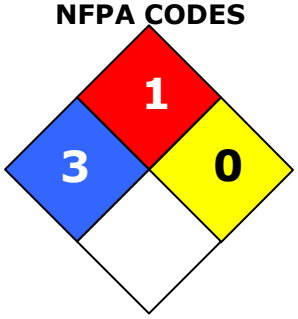


Part B

HMIS RATING

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

NFPA CODES



Health and Safety: The 832 parts can ignite if the liquid is heated.

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.

While the product has low volatility and moderate odor, use in well-ventilated area.

The cured epoxy resin presents no known hazard.

Application Instructions

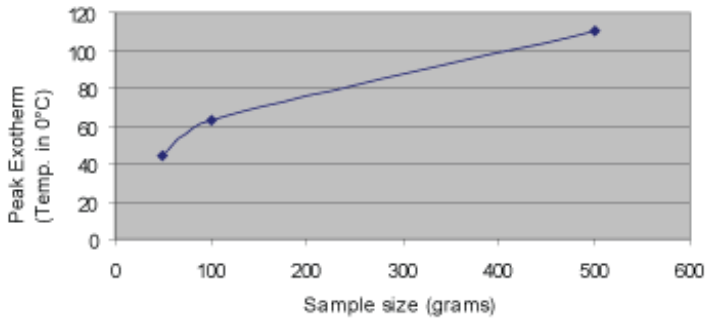
Follow the procedure below for best results. If you have little or no experience with the 832C epoxy, please follow the long instructions instead. The short instructions provided here are not suitable for first time users.

To prepare 2:1 (A:B) epoxy mixture

1. Scrape any settled material in the ***Part A*** container; and stir and fold material until homogenous.
2. Scrape any settled material in the ***Part B*** container; and stir and fold material until homogenous.
3. Measure ***two*** parts by volume of the pre-stirred ***A,*** and pour in the mixing container.
4. Measure ***one*** part by volume of the pre-stirred ***B***, and slowly pour in the mixing container while stirring.
5. Put in a vacuum chamber, bring to 25 Hg/in pressure, and wait for 2 minutes to de-air.
   —OR—
   Let sit for 30 minutes to de-air.
6. If bubbles are present at top, use the mixing paddle to gently break them.
7. Pour mixture into the mold or container containing the components to be encapsulated.

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.

Peak Exotherm Temperature



To room temperature cure the 832C epoxy

Let stand for 24 hours.

To heat cure the 832C epoxy

Put in oven at 65 °C [149 °F] for 60 minutes.

–OR–

Put in oven at 80 °C [176 °F] for 45 minutes.

–OR–

Put in oven at 100 °C [212 °F] for 35 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

Product Availability

Cat. No.	*Form*	*Net Volume*		*Net Weight*		*Shipping Weight*	
832C-375ML	Liquid	0.375 L	12 oz	0.4 kg	0.9 lb	0.6 kg	1.3 lb
832C-3L	Liquid	3 L	0.8 gal	3.2 kg	7.1 lb	3.6 kg	8 lb
832C-60L	Liquid	60 L	16 gal	65 kg	144 lb	68 kg	150 lb

Supporting Products

- 8328 Epoxy and Adhesive Cleaner
- 8329 Epoxy Mold Release (for temperature cures ≤85 °C)

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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Disclaimer

This information is believed to be accurate. It is intended for professional end users having the skills 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.

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