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 and Features

- **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 by volume** compatible with most dispensing equipment
- **Negligible Volatile Organic Content (VOC)**
- **RoHS Compliant**

Usage Parameters

Properties	*Value*
Working Life [a)]	60 min
Shelf Life	≥3 y
Full Cure @22 °C [72 °F]	24 h
Full Cure @65 °C [149 °F]	60 min
Full Cure @80 °C [176 °F]	45 min
Full Cure @100 °C [212 °F]	35 min

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

Temperature Ranges

Properties	*Value*
Constant Service Temperature	-30 to 140 °C [-22 to 284 °F]
Maximum Intermittent Temperature [b)]	175 °C [347 °F]
Storage Temperature of Unmixed Parts	16 to 27 °C [60 to 80 °F]

b) The maximum intermittent temperature provides temperature extremes that can be withstood without damage 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
Density @26 °C [79 °F]	ASTM D 792	1.12 g/mL
Hardness	Shore D durometer	84D
Tensile Strength	ASTM D 638	56 N/mm^2 [8 100 lb/in^2]
Elongation	"	6.4%
Lap Shear Strength (SS 304)	ASTM D 1002	4.4 N/mm^2 [640 lb/in^2]
Izod Impact [b]	ASTM D 256	1.47 kJ/m^2 [0.700 ft·lb/in]
Compressive Strength	ASTM D 695	182 N/mm^2 [26 500 lb/in^2]
Flexural Strength	ASTM D 790	38 N/mm^2 [5 500 lb/in^2]

Electrical 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”	Reference fit [c]	50.7 kV
Dielectric Strength	"	406 V/mil [15.7 kV/mm]
Volume Resistivity	ASTM D 257	1.22 x 10^{16} Ω·cm
Surface Resistivity [d]	"	5.50 x 10^{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 Tautscher equation was fitted to the experimental dielectric strengths and interpolated to 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*
Glass Transition Temperature (T_g)	ASTM D 3418	35 °C [95 °F]
Coefficient of Thermal Expansion (CTE) [e]	ASTM E 831	
Before Tg		77 ppm/°C
After Tg		195 ppm/°C
Thermal Conductivity @25 °C [77 °F]	ASTM E 1461	0.276 W/(m·K)
@50 °C [122 °F]	"	0.294 W/(m·K)
@100 °C [212 °F]	"	0.309 W/(m·K)
Heat Deflection Temperature (HDT) [f]	ASTM D 648	44 °C [111 °F]

e) Coefficient of Thermal Expansion (CTE) units are in ppm/°C = in/in/°C × 10^{-6} = unit/unit/°C × 10^{-6}
f) HDT under 1820 kPa [264 lb/in^2] load

Properties of Uncured 832C

Physical Properties	*Mixture*
Color	Translucent, Amber Tint
Viscosity [a] @20 °C [73 °F]	2 700 cP [2.7 Pa·s]
Density	1.08 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 Properties	*Part A*	*Part B*
Color	Translucent, Amber Tint	Clear, Amber Tint
Viscosity [a] @24°C [73 °F]	1 900 cP [1.9 Pa·s]	5 800 cP [5.8 Pa·s]
Density	1.13 g/mL	0.963 g/mL
Flash Point	>150 °C [>302 °F]	>122 °C [>252 °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.

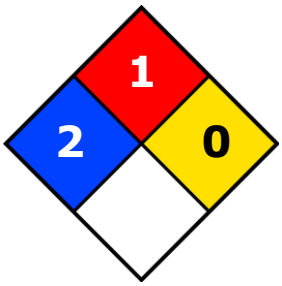
Health and Safety

Part A

HMIS® RATING

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

NFPA® 704 CODES

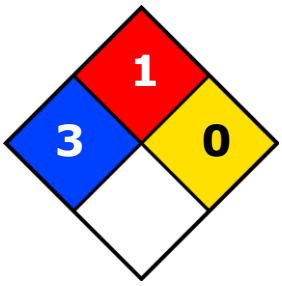


Part B

HMIS® RATING

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

NFPA® 704 CODES



Approximate HMIS and NFPA Risk Ratings Legend:
0 (Low or none); 1 (Slight); 2 (Moderate); 3 (Serious); 4 (Severe)

Health and Safety: The 832C 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.

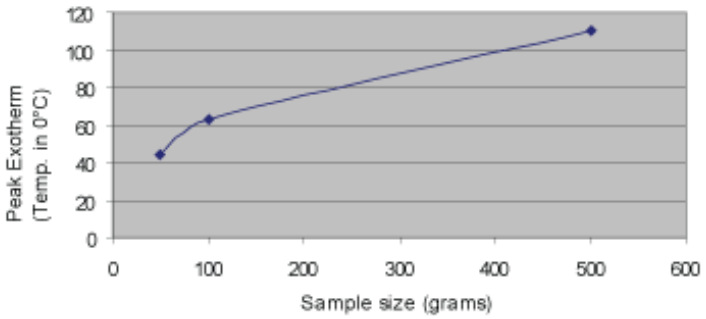
ATTENTION! If the parts have clumped (crystallized), pre-heat at 50 °C [122 °F] until fully re-liquefied. Let cool to room temperature before use.

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. 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.
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

Cat. No.	*Packaging*	*Net Volume*		*Net Weight*		*Packaging Weight*	
832C-375ML	Bottle	375 mL	12.7 fl oz	402 g	12.9 oz	0.6 kg	1.3 lb
832C-450ML	Cartridge	450 mL	25.3 fl oz	483 g	15.5 oz	TBD	TBD
832C-3L	Can	2.55 L	5.39 pt	2.73 kg	6.0 lb	3.6 kg	8.0 lb
832C-60L	Pail	60 L	16 gal	64.3 kg	142 lb	65 kg	150 lb

Note: Package weight is an estimate: it may vary due to the use of different boxes and packing material

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.

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