Translucent Epoxy, Encapsulating & Potting Compound

Description

832C *potting and encapsulating compound* is a general purpose, hard, translucent amber two-part epoxy that offers extreme environmental, mechanical and physical protection for printed circuit boards and electronic assemblies.

832C is specifically designed for applications where visual inspection is required. Due to its 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 2:1 volume mix ratio, making it compatible with most dispensing equipment. 832C can be cured at room temperature or higher.

Features and Benefits

- *Translucent amber color (allows for visual inspection)*
- *Convenient 2A:1B volume mix ratio*
- *Low mixed viscosity of 2 700 cP*
- *Extremely high compressive and tensile strength*
- *Excellent adhesion to a wide variety of substrates including metals, composites, glass, ceramics, and many plastics*
- *Excellent electrical insulating characteristics*
- *Broad service temperature range -40 to 140 °C (-40 to 284 °F)*
- *Extreme resistance to water and humidity (allows for submersion where needed)*
- *Solvent-free*

Usage Parameters

Properties	Value
Working life @22 °C [72 °F]	1 h
Shelf life	5 y
Full cure @22 °C [72 °F]	24 h
Full cure @65 °C [149 °F]	1 h
Full cure @80 °C [176 °F]	30 min
Full cure @100 °C [212 °F]	15 min

Temperature Ranges

Properties	Value
Constant service temperature	-40 to 140 °C [-40 to 284 °F]
Maximum intermittent temperature [a)]	175 °C [347 °F]
Storage temperature of unmixed parts	16 to 27 °C [61 to 81 °F]

a) Temperature that can be withstood for short periods without sustaining damage.

Cured Properties

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 %	ASTM D 638	6.4%
Lap shear strength (SS 304)	ASTM D 1002	4.4 N/mm^2 [640 lb/in^2]
Izod impact @0.214"	ASTM D 256	1.5 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]
Lap shear strength (stainless steel)	ASTM D 1002	17 N/mm^2 [2 500 lb/in^2]
Lap shear strength (aluminum)	ASTM D 1002	18 N/mm^2 [2 600 lb/in^2]
Lap shear strength (copper)	ASTM D 1002	16 N/mm^2 [2 300 lb/in^2]
Lap shear strength (brass)	ASTM D 1002	11 N/mm^2 [1 700 lb/in^2]
Lap shear strength (polycarbonate)	ASTM D 1002	2.6 N/mm^2 [370 lb/in^2]
Lap shear strength (ABS)	ASTM D 1002	3.8 N/mm^2 [550 lb/in^2]

Note: Specifications are for epoxy samples cured at 65 °C for 1 h and conditioned at ambient temperature and humidity.

a) N/mm^2 = mPa; lb/in^2 = psi

Cured Properties

Electrical Properties	Method	Value
Breakdown voltage @2.9 mm	ASTM D 149	48 500 V [48.5 kV]
Dielectric strength @2.9 mm	ASTM D 149	425 V/mil [16.7 kV/mm]
Breakdown voltage @3.175 mm [1/8"]	Reference fit [a)]	50 700 V [50.7 kV]
Dielectric strength @3.175 mm [1/8"]	Reference fit [a)]	406 V/mil [15.7 kV/mm]
Resistivity	ASTM D 257	1.2 x 10^{16} Ω·cm
Conductivity	ASTM D 257	8.3 x 10^{-17} S/cm
Surface resistivity	ASTM D 257	5.5 x 10^{15} Ω/sq
Thermal Properties	**Method**	**Value**
Glass transition temperature (T_g)	ASTM D 3418	35 °C [95 °F]
CTE [b)] prior T_g after T_g	ASTM E 831 ASTM E 831	77 ppm/°C [171 ppm/°F] 195 ppm/°C [383 ppm/°F]
Thermal conductivity @25 °C [77 °F] @50 °C [122 °F] @100 °C [212 °F]	ASTM E 1461 ASTM E 1461 ASTM E 1461	0.28 W/(m·K) 0.29 W/(m·K) 0.31 W/(m·K)
Heat Deflection Temperature (HDT) [c)]	ASTM D 648	44 °C [111 °F]

Note: Specifications are for epoxy samples cured at 65 °C for 1 h and conditioned at ambient temperature and humidity.

a) To allow comparison between products, the dielectric strength was recalculated with the Tautscher equation fitted to 5 experimental values and extrapolated to a standard thickness of 1/8" (3.175 mm).
b) Coefficient of Thermal Expansion (CTE) units are in ppm/°C = in/in/°C × 10^{-6} = unit/unit/°C × 10^{-6}
c) HDT under 1820 kPa [264 lb/in^2] load.

Uncured Properties

Physical Properties	Mixture (A:B)
Color	Translucent, amber
Viscosity @20 °C [73 °F]	2 700 cP [2.7 Pa·s] a)
Density	1.08 g/mL
Mix ratio by volume	2:1
Mix ratio by weight	2.3:1
Solids content (w/w)	100%

Physical Properties	Part A	Part B
Color	Translucent, amber	Clear, amber
Viscosity @24 °C [73 °F]	1 900 cP [1.9 Pa·s] a)	5 800 cP [25.8 Pa·s] a)
Density	1.13 g/mL	0.96 g/mL
Odor	Mild	Musty

a) Brookfield viscometer at 50 rpm with spindle LV S64

Compatibility

Adhesion—As seen in the substrate adhesion table, 832C 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 that may affect adhesion. If contamination is present, first clean the surface to be coated with MG Chemicals 824 Isopropyl Alcohol.

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.

Substrate Adhesion (In Decreasing Order)

Physical Properties	Adhesion
Steel	Stronger
Aluminum	
Fiberglass	
Wood	
Glass	
Rubber	
Polycarbonate	
Acrylic	Weaker
Polypropylene	Does not bond

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%
Isohexanes	5%	8%
Acetone	7%	a)

a) Destroyed

Storage

Store between 16 and 27 °C [61 and 81 °F] in a dry area, away from sunlight. Storage below 16 °C [61 °F] can result in crystallization.

If crystallization occurs, reconstitute the product 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 product thoroughly. Make sure to reincorporate all settled material, close the lid, and then let cool before use.

Health and Safety

Please see the 832C 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.

Manual mixing:

1. Measure 2 parts by volume of part A, and pour into the mixing container. Ensure all contents are transferred by scraping the container.
2. Measure 1 part by volume of part B, and pour slowly into the mixing container while stirring. Ensure all contents are transferred by scraping the container.
3. Thoroughly mix parts A and B together.
4. Let sit for 15 minutes to de-air.
   —OR—
   Put in a vacuum chamber at 25 inHg for 2 minutes to de-air.
5. If bubbles are present at the top, break and stir them gently with the mixing paddle.
6. Pour the mixture into a container holding the components to be protected.
7. Close the part A and B containers tightly between uses to prevent skinning.

Attention!

Mixing >500 g at a time decreases working life and can lead to a flash cure. Limit the size of hand-mixed batches. For large production volumes, contact MG Chemicals Technical Support for assistance.

Cartridge:
To insert the cartridge in the gun, see the Application Guide section for dispensing accessories.

1. Twist and remove the cap from the cartridge. Do not discard cap.
2. Dispense a small amount to ensure even flow of both parts.
3. (Optional) Attach a static mixer.
   a. Dispense and discard 20 to 30 mL of the product to ensure a homogeneous mixture.
   b. After use, dispose of static mixer.
4. Without a static mixer, dispense material on a mixing surface or container, and thoroughly mix parts A and B together.
5. To stop the flow, pull back on the plunger.
6. Clean nozzle to prevent contamination and material buildup.
7. Replace the cap on the cartridge or syringe.

Cure Instructions

Room temperature cure:
- Let cure at room temperature for 24 h.

Heat cure:
- Put in oven at 65 °C [149 °F] for 1 h.
  —OR—
- Put in oven at 80 °C [176 °F] for 30 min.
  —OR—
- Put in oven at 100 °C [212 °F] for 15 min.

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.

Dispensing Accessories

Consult the table below for appropriate accessory selection. See the Application Guide for instructions on using the dispensing accessories.

Cat. No.	Dispensing Gun	Static Mixer
832C-450ML	8DG-450-2-1	8MT-450

Packaging and Supporting Products

Cat. No.	Packaging	Net Volume	Net Weight	Packaged Weight
832C-375ML	2 Bottle kit	375 mL [12.7 fl oz]	402 g [12.9 oz]	0.6 kg [1.3 lb]
832C-450ML	Dual cartridge	450 mL [15.2 fl oz]	483 g [15.5 oz]	0.7 kg [1.6 lb]
832C-3L	3 Can kit	2.55 L [5.39 pt]	2.74 k [1.06 lb]	3.6 kg [8.0 lb]
832C-60L	3 Pail kit	60 L [16 gal]	64.4 kg [142 lb]	65 kg [150 lb]

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.

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