

Description

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

832WC is designed for applications where high clarity is required. Due to its very low mixed viscosity, it can easily penetrate small gaps and cavities. It also provides excellent electrical insulation and protects circuit board and other electronic devices 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. 832WC can be cured at room temperature or higher.

Benefits and Features

- **Optically clear color (allows visual inspection)**
- **UV light stable (non-yellowing) up to 100 °C**
- **Very low mixed viscosity of 980 cP**
- **Convenient 2A:1B volume mix ratio**
- **Excellent electrical insulating characteristics**
- **Extremely high compressive and tensile strength**
- **Good adhesion to a wide variety of substrates including metals, composites, glass, ceramics, and many plastics**
- **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

<i>Properties</i>	<i>Value</i>
Working Time @22 °C [72 °F] ^{a)}	1 h
Full Cure @22 °C [72 °F]	72 h
Full Cure @65 °C [149 °F]	TBD
Full Cure @80 °C [176 °F]	1 h
Full Cure @100 °C [212 °F]	TBD

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

<i>Properties</i>	<i>Value</i>
Constant Service Temperature	-40 to 140 °C [-40 to 284 °F]
Intermittent Temperature Limit ^{b)}	-50 to 155 °C [-58 to 311 °F]
Storage Temperature of Unmixed Parts	16 to 27 °C [60 to 80 °F]

b) Temperature range that components can withstand for short periods without sustaining damage.

Principal Components

Name	CAS Number
Part A: Bisphenol A Resin	30583-72-3
Part B: Benzyl alcohol	100-51-6
Cyclohexanemethanamine	68609-08-5
3-aminomethyl-3,5,5-trimethylcyclohexylamine	2855-13-2

Properties of Cured 832WC

<i>Physical Properties</i>	<i>Method</i>	<i>Value</i> ^{a)}
Color	Visual	Optically clear
Density @22 °C [72 °C]	ASTM D 792	1.06 g/cm ³
Hardness	Shore D Durometer	82D
Tensile Strength	ASTM D 638	10 N/mm ² [1 490 lb/in ²]
Compressive Strength	ASTM D 695	157 N/mm ² [22 800 lb/in ²]
Lap Shear Strength (Aluminum)	ASTM D 1002	6.8 N/mm ² [980 lb/in ²]
Lap Shear Strength (Brass)	ASTM D 1002	3.8 N/mm ² [555 lb/in ²]
Lap Shear Strength (Copper)	ASTM D 1002	2.9 N/mm ² [419 lb/in ²]
Lap Shear Strength (Stainless Steel)	ASTM D 1002	3.3 N/mm ² [476 lb/in ²]
Lap Shear Strength (ABS)	ASTM D 1002	1.5 N/mm ² [222 lb/in ²]
Lap Shear Strength (Polycarbonate)	ASTM D 1002	2.1 N/mm ² [299 lb/in ²]
<i>Electrical Properties</i> ^{b)}	<i>Method</i>	<i>Value</i>
Breakdown Voltage @2.3 mm	ASTM D 149	41 kV
Dielectric Strength @2.3 mm	ASTM D 149	18 kV/mm [465 V/mil]
Breakdown Voltage @3.175 mm [1/8"]	Reference fit ^{b)}	49 kV
Dielectric Strength @3.175 mm [1/8"]	Reference fit ^{b)}	16 kV/mm [394 V/mil]
Volume Resistivity	ASTM D 257	1.6 x 10 ¹⁷ Ω·cm
Dielectric Dissipation, D @1 MHz	ASTM D 150-11	0.028
Dielectric Constant, k' @1 MHz	ASTM D 150-11	3.23
<i>Thermal Properties</i>	<i>Method</i>	<i>Value</i>
Glass Transition Temperature (T _g)	ASTM E 831	33 °C [91 °F]
Coefficient of Thermal Expansion (CTE) ^{c)}	ASTM E 831	
Before T _g	ASTM E 831	80 ppm/°C
After T _g	ASTM E 831	192 ppm/°C

Note: Specifications are for epoxy samples cured at 80 °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/mm² = mPa; lb/in² = psi;

b) To allow comparison between products, the Tautscher equation was fitted to 10 experimental dielectric strengths and interpolated for 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 832WC

<i>Physical Properties</i>	<i>Mixture</i>	
Color	Clear	
Viscosity ^{a)} @25 °C [77 °F]	979 cP [0.97 Pa·s]	
Density	1.06 g/mL	
Mix Ratio by volume (A:B)	2:1	
Mix Ratio by weight (A:B)	2:1	
<i>Physical Properties</i>	<i>Part A</i>	<i>Part B</i>
Color	Clear	Clear
Viscosity	2 860 cP [2.86 Pa·s] ^{b)}	340 cP [0.34 Pa·s] ^{c)}
Density	1.09 g/mL	1.03 g/mL
Flash Point	>115 °C [>240 °F]	>112 °C [>234 °F]
Odor	Mild	Ammoniacal

a) Brookfield viscometer at 100 RPM with spindle LV S63


b) Brookfield viscometer at 100 RPM with spindle LV S64

c) Brookfield viscometer at 60 RPM with spindle LV S62

Compatibility

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

<i>Physical Properties</i>	<i>Adhesion</i>
Aluminum	<p>Stronger</p>  <p>Weaker</p>
Steel	
Fiberglass	
Wood	
Paper, Fiber	
Glass	
Rubber	
Polycarbonate	
Acrylic	
Polypropylene ^{a)}	

a) Does not bond to polypropylene

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 832WC **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 2:1 (A:B) epoxy mixture:

- Scrape settled material free from the bottom and sides of **Part A** container; stir material until homogenous.
- Measure **two** parts 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 80 °C [176 °F] for 1 hour.

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

<i>Cat. No.</i>	<i>Packaging</i>	<i>Net Volume</i>		<i>Net Weight</i>		<i>Packaged Weight</i>
832WC-375ML	Bottle	375 mL	12.6 fl oz	401 g	14.1 oz	TBD
832WC-3L	Can	2.7 L	2.85 qt	2.89 kg	6.37 lb	TBD
832WC-12L	Pail	10.8 L	2.88 gal	11.5 kg	25.5 lb	TBD
832WC-60L	Pail	60 L	16 gal	64.2 kg	141 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.

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