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Optically Clear Epoxy Encapsulating & Potting Compound 8322 Technical Data Sheet

Description

Our 8322 *Optically Clear Epoxy* offers a very strong and UV-resistant finish. This two-part epoxy is simple to mix and use. It does not require special or costly equipment to apply.

The 8322 epoxy 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 8322 epoxy is used to pot or encapsulate LEDs and 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

- **Excellent chemical resistance**
- **Extreme resistance to water and humidity**
- **Optically clear**
- **UV light stable**—non-yellowing

Usage Parameters

<i>Properties</i>	<i>Value</i>
Working Life @22 °C [72 °F] ^{a)}	2 h
Shelf Life	≥3 y
Full Cure @65 °C [149 °F]	4 h
Full Cure @80 °C [176 °F]	2 h

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

ATTENTION! Do NOT cure at room temperature. This product must be heat cured.

Temperature Ranges

<i>Properties</i>	<i>Value</i>
Constant Service Temperature	-40 to 80 °C [-40 to 176 °F]
Max Intermittent Temperature ^{b)}	100 °C [212 °F]
Storage Temperature	25 °C [77 °F]

b) Maximum short-term exposure temperature toleration limit—not recommended as a sustained or repeated operation condition



ISO 9001 Registered Quality System.
Burlington, Ontario, Canada QMI File # 004008

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8322

Principal Components

Name	CAS Number
Part A: Epoxy Resin	30583-72-3
Part B: Epoxy Hardener	2855-13-2

Properties of Cured 8322

<i>Physical Properties</i>	<i>Method</i>	<i>Value</i> ^{a)}
Color	Visual	Clear
Density @25 °C [77 °F]	ASTM D 792	1.06 g/mL
Hardness	Shore	86D
UV Resistant	—	Yes
Tensile Elongation	ASTM D 638	TBD
Tensile Strength	"	TBD
Compressive Strength	ASTM D 695	85 N/mm ² [12 000 lb/in ²]
Lap Shear Strength (Stainless Steel)	ASTM D 1002	13 N/mm ² [1 800 lb/in ²]
Lap Shear Strength (Aluminum)	"	6 N/mm ² [900 lb/in ²]
<i>Electrical Properties</i>	<i>Method</i>	<i>Value</i>
Breakdown Voltage	ASTM D 149	TBD
Dielectric Strength	"	TBD
Volume Resistivity	ASTM D 257	5 × 10 ⁻¹² Ω·cm
<i>Thermal Properties</i>	<i>Method</i>	<i>Value</i>
Glass Transition Temperature (T _g)	ASTM D 115	109 °C
Coefficient of Thermal Expansion ^{b)}		
Below T _g	ASTM E 831	18 ppm/°C
Above T _g	"	127 ppm/°C
Thermal Conductivity @25 °C [77 °F]	ASTM E 1461	0.237 W/(m·K)
@50 °C [122 °F]	"	0.281 W/(m·K)
@100 °C [212 °F]	"	0.294 W/(m·K)
Thermal Diffusivity @25 °C [77 °F]	"	0.119 mm ² /s
Thermal Cycling Stability	-40 to 200 °C	Passed
Thermal Stability 24 h @80 °C [176 °F] on Cu/Al substrates		No yellowing
Thermal Stability 96 h @100 °C [212 °F] on Cu/Al substrates		Slight yellowing

TBD=To be determined

a) N/mm² = mPa; lb/in² = psi;

b) Coefficient of Thermal Expansion (CTE) units are in ppm/°C = in/in/°C × 10⁻⁶ = unit/unit/°C × 10⁻⁶

<i>Chemical Resistance</i>	<i>Method</i>	<i>Value</i>
Water	—	Good
Acid (10% sulfuric acid)	—	Excellent
Alkali (1% sodium hydroxide)	—	Excellent
Salt water	—	Excellent
Copper corrosion	—	None expected

The transmittance and reflectance measurements are plotted in Figures 1 and 2.

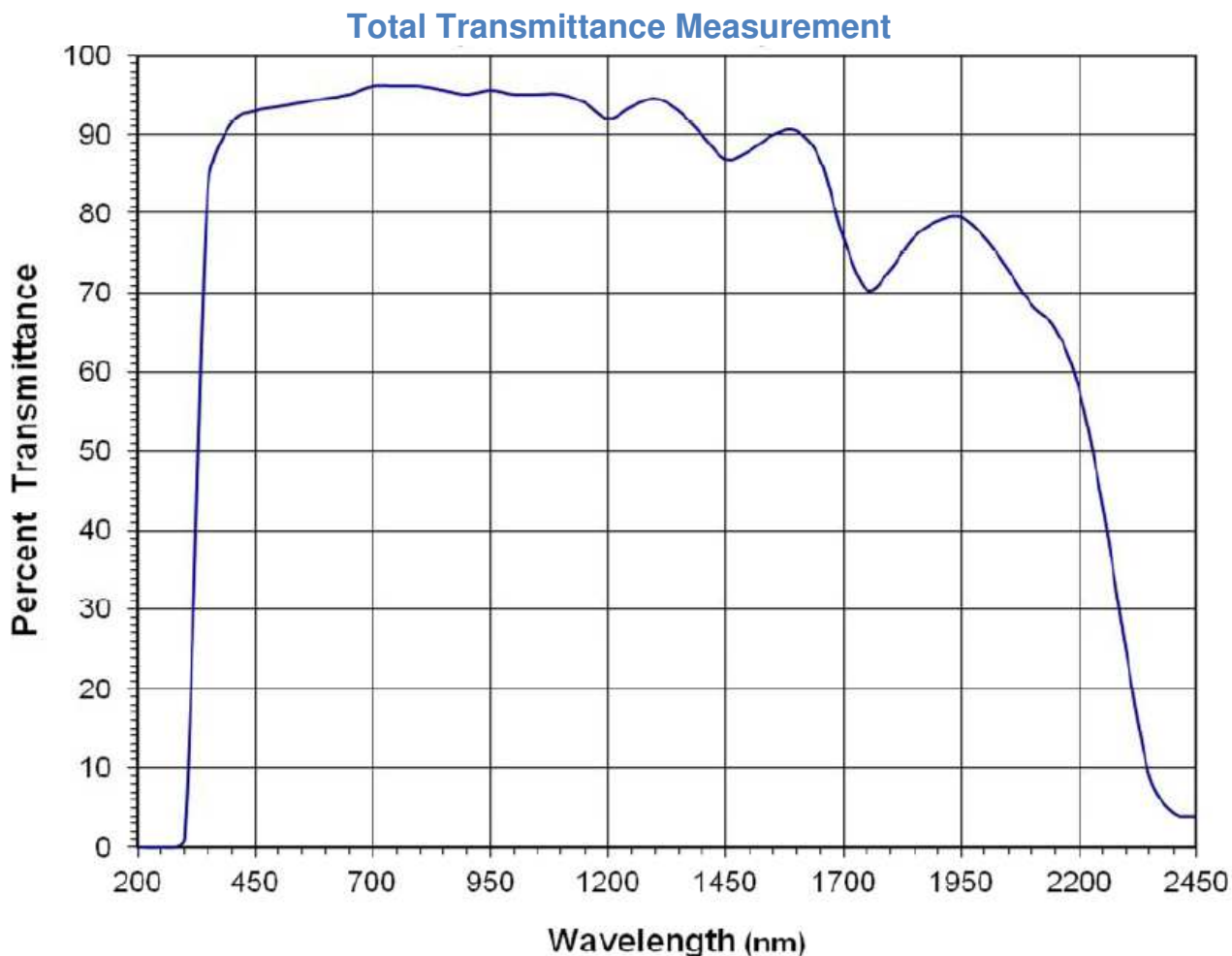


Figure 1. The total transmittance measured between 200 to 2 450 nm at 23 °C ±2 °C and 45 °C ±5 °C relative humidity. A sample of the cured 8322 at ~1 mm thickness was used.

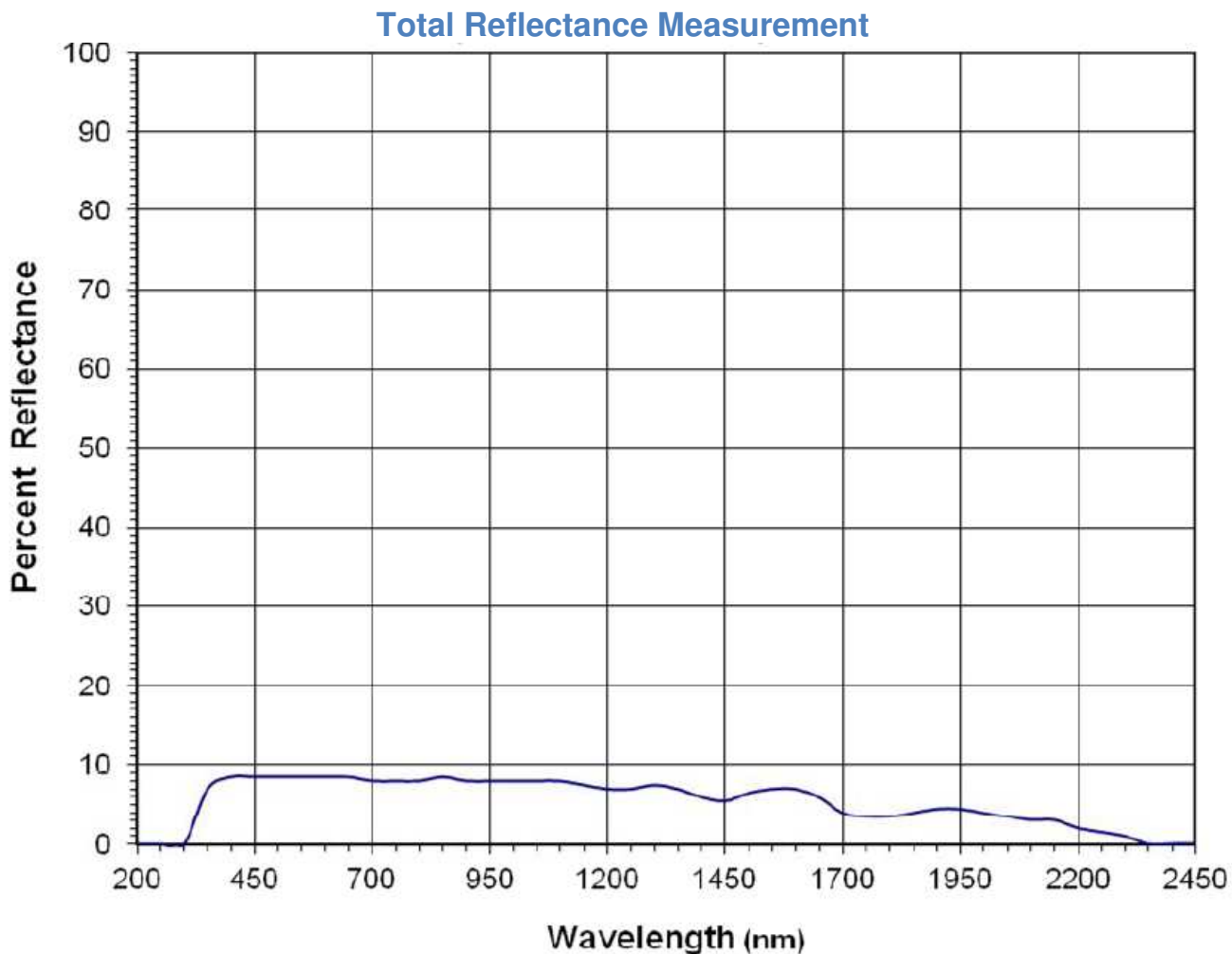


Figure 2. The total reflectance measured between 200 to 2 450 nm at 23 °C ±2 °C and 45 °C ±5 °C relative humidity. A sample of the cured 8322 at ~1 mm thickness was used.

Properties of Uncured 8322

<i>Physical Property</i>	<i>Mixture</i>	
Color	Colorless	
Density	1.09 g/mL	
Mix Ratio by weight (A:B)	5.0:1.0	
Mix Ratio by volume (A:B)	4.0:1.0	
<i>Physical Property</i>	<i>Part A</i>	<i>Part B</i>
Color	Colorless	Colorless
Viscosity	2500 cP [2.5 Pa·s] ^{a)}	20 cP [0.020 Pa·s] ^{b)}
Density	1.09 g/mL	0.92 g/mL
Flash Point	115 °C [239 °F]	112 °C [234 °F]
% solids	100%	100%
Odor	Odorless	Ammonia-like

Note: Unless indicated otherwise, densities and viscosities were taken at 25°C [77 °F].

a) Brookfield viscometer at 10 RPM with spindle LV2

b) Brookfield viscometer at 60 RPM with spindle LV2

Compatibility

Adhesion—The 8322 epoxy adheres well to printed circuit boards and their components; however, it is not compatible with contaminants like water, oil, and greasy flux residues that may affect adhesion. If contamination is present on the substrate, clean the surface first.

8322 Adherence Compatibility

Substrate	Adhesion Test Rating ASTM D339
ABS Plastic	5B = Excellent
Aluminum	5B = Excellent
Copper	5B = Excellent
FR4 Fiber Board	5B = Excellent
Glass	5B = Excellent

Compatibility—The 8322 epoxy doesn't have any known incompatibilities with materials commonly found on printed circuit assemblies. If in doubt, always test for possible incompatibilities on test coupons prior to doing a full scale application.

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, Safety, and Environmental Awareness

Please see the 8322 **Safety Data Sheet** (SDS) for more details on transportation, storage, handling and other security guidelines.

Environmental Impact: The 8322 formulation is designed for industrial use. Part A and Part B liquids are toxic to aquatic life; avoid runoff into storm and sewer drains. Once cured, this epoxy is not considered to be an environmental hazardous.

Health and Safety

Please see the 8322 **Safety Data Sheet** (SDS) parts A and B for more details on transportation, storage, handling and other security guidelines.

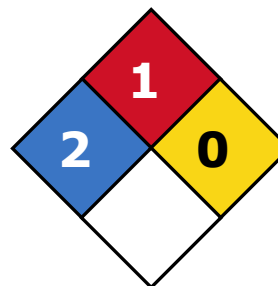
Wear safety glasses or goggles and disposable polyvinyl chloride, neoprene, or nitrile gloves while handling liquids. Part B in particular causes skin burns and may cause sensitization if exposed over a long period of time.

Part A

HMIS® RATING

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

NFPA® 704 CODES

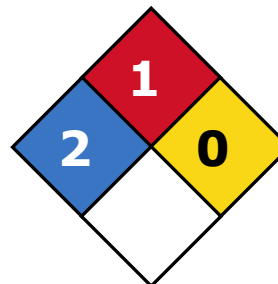


Part B

HMIS® RATING

HEALTH:	* 2
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)

Application Instructions

Follow the procedure below for best results. If you have little or no experience with the 8322 epoxy, please follow the long instructions instead. The short instructions provided here are not suitable for first time users.

To prepare 4:1 (A:B) epoxy mixture by volume

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 **four** 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! The 8322 will only cure at elevated temperatures. DO NOT cure at room temperature.

To cure the epoxy

Full cure can be achieved in 2 hours in an oven at 80 °C [176 °F]. Let stand at room temperature for an additional 30 minutes.



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Packaging and Supporting Products

<i>Cat. No.</i>	<i>Packaging</i>	<i>Net Volume</i>		<i>Net Weight</i>		<i>Packaging Weight</i>	
8322-1	Can	1 125 mL	38 fl oz	1.19 kg	2.6 lb	1.3 kg	2.9 lb
8322-2	Can	4.5 L	1.2 gal	4.75 kg	10.5 lb	5.0 kg	11 lb
8322-3	Pail	18.9 L	10.7 gal	19.94 kg	44.0 lb	22.0 kg	48 lb

Supporting Products

- *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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Warranty

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