Thermally Conductive Epoxy Adhesive

Description

8329TCM is a thermally conductive two-part epoxy adhesive. It is dark grey, smooth, viscous, thixotropic, and bonds well to a wide variety of substrates.

This product is used to bond heat sinks, LEDs, and other heat-generating components in electronic assemblies.

8329TCM has been designed for maximum thermal conductivity with a high viscosity. For a lower viscosity, use 8329TFM. For a faster working life, use 8329TCF. For a longer working life, use 8329TCS.

Features and Benefits

- *Thermal conductivity: 1.4 W/(m·K)*
- *1:1 mix ratio*
- *Working life: 45 minutes*
- *Cure time: 24 hours room temperature or 1 hour at 65 °C (149 °F)*
- *Provides strong electrical insulation*
- *High tensile and compressive strength*
- *Strong resistance to humidity, salt water, mild bases, and aliphatic hydrocarbons*
- *Shelf life: ≥3 years*
- *RoHS 3 compliant*

Usage Parameters

Properties	Value
Working life @22 °C [72 °F]	45 min
Shelf life @22 °C [72 °F]	≥3 y
Service cure @22 °C [72 °F]	5 h
Full cure @22 °C [72 °F]	24 h
Full cure @65 °C [149 °F]	1 h
Full cure @80 °C [176 °F]	45 min
Full cure @100 °C [212 °F]	20 min

Temperature Ranges

Properties	Value
Constant service temperature	-40 to 150 °C [-40 to 302 °F]
Storage temperature	22 to 27 °C [72 to 81 °F]

Cured Properties

Physical Properties	Method	Value [a)]
Color	Visual	Dark grey
Density @25 °C [77 °F]	ASTM D 1475	2.30 g/mL
Hardness	Shore D Durometer	77D
Tensile strength	ASTM D 638	10 N/mm^2 [1 400 lb/in^2]
Compressive strength	ASTM D 695	34 N/mm^2 [4 900 lb/in^2]
Lap shear strength (stainless steel)	ASTM D 1002	6.4 N/mm^2 [930 lb/in^2]
Lap shear strength (aluminum)	ASTM D 1002	6.1 N/mm^2 [880 lb/in^2]
Lap shear strength (copper)	ASTM D 1002	6.0 N/mm^2 [870 lb/in^2]
Lap shear strength (brass)	ASTM D 1002	5.7 N/mm^2 [830 lb/in^2]
Lap shear strength (polycarbonate)	ASTM D 1002	1.7 N/mm^2 [250 lb/in^2]
Lap shear strength (ABS)	ASTM D 1002	2.4 N/mm^2 [350 lb/in^2]
Water absorption (relative mass change)	ASTM D 570	0.35%
Outgassing (total mass loss) @125 °C [257 °F] for 24 h	ASTM E 595	3.54%
Water vapor regain	ASTM E 595	0.15%
Collected volatile condensable materials	ASTM E 595	0.18%

Note: Specifications are for epoxy samples cured at 64 °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 @4.5 mm	ASTM D 149	29 000 V [29 kV]
Dielectric strength @4.5 mm	ASTM D 149	164 V/mil [6.5 kV/mm]
Breakdown voltage @3.175 mm [1/8"]	Reference fit [a)]	24 300 V [24.3 kV]
Dielectric strength @3.175 mm [1/8"]	Reference fit [a)]	195 V/mil [7.7 kV/mm]
Volume resistivity	ASTM D 257	9 x 10^{12} Ω·cm
Volume conductivity	ASTM D 257	1.1 x 10^{-13} S/cm
Dielectric dissipation, D @1 MHz	ASTM D 150-11	0.025
Dielectric constant, k' @1 MHz	ASTM D 150-11	5.43
Thermal Properties	**Method**	**Value**
Glass transition temperature (T_g)	ASTM E 3418	46 °C [115 °F]
CTE [b)] prior T_g after T_g	ASTM E 831 ASTM E 831	71 ppm/°C [160 ppm/°F] 131 ppm/°C [268 ppm/°F]
Thermal conductivity @25 °C [77 °F] @50 °C [222 °F] @100 °C [212 °F]	ASTM E 1461 92 ASTM E 1461 92 ASTM E 1461 92	1.4 W/(m·K) 1.3 W/(m·K) 1.3 W/(m·K)
Thermal diffusivity @25 °C [77 °F]	ASTM E 1461 92	0.7 mm^2/s
Specific heat capacity @25 °C [77 °F]	ASTM E 1461 92	0.9 J/(g·K)
Heat deflection termperature (HDT)	ASTM E 648	42 °C [108 °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}

Uncured Properties

Physical Properties	Mixture (A:B)
Color	Dark grey
Viscosity	Thixotropic
Density	2.47 g/mL
Mix ratio by volume	1:1
Mix ratio by weight	0.93:1
Solids content (w/w)	100%

Physical Properties	Part A	Part B
Color	Dark grey	Dark grey
Viscosity @25 °C [77 °F]	780 000 cP [780 Pa·s] [a)]	810 000 cP [810 Pa·s] [b)]
Density	2.51 g/mL	2.43 g/mL
Odor	Mild	Mercaptan

a) Brookfield viscometer at 12 rpm with spindle RV F96
b) Brookfield viscometer at 1 rpm with spindle RV F96

Compatibility

Adhesion—8329TCM 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.

For substrate substances with weak adhesion strengths, surface preparation such as sanding or pre-coating with a suitable primer may improve adhesion.

Chemical resistance—Once cured, the epoxy adhesive is inert under normal conditions. It will resist water and salt exposure.

It is expected to resist short term exposures to fuels or similar non-polar organic solvents, but it is not suitable for prolonged exposures. Avoid use with strong acids, strong bases, or strong oxidizers.

Storage

Store between 22 to 27 °C [72 to 81 °F] in a dry area, away from sunlight. Some of the components are sensitive to air, always recap firmly when not in use to maximize shelf life.

Substrate Adhesion (In Decreasing Order)

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

Health and Safety

Please see the 8329TCM 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. For quantities less than 1 mL or for stricter stoichiometry control, mix by weight with a high-precision balance. Heat cure to achieve optimal conductivity.

Can or jar:

1. Stir each part individually to re-incorporate material that may have separated during storage.
2. Measure 0.93 parts by weight of A.
3. Measure 1 part by weight of B.
4. Thoroughly mix parts A and B together.
5. Apply adhesive to the application area.

Syringe:

1. Twist and remove the cap from the syringe. Do not discard cap.
2. Measure 1 part by volume of A.
3. Measure 1 part by volume of B.
4. 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 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 45 min.
  —OR—
- Put in oven at 100 °C [212 °F] for 20 min.

Packaging and Supporting Products

Cat. No.	Packaging	Net Weight	Net Volume	Packaged Weight
8329TCM-6ML	2 Syringe kit	14.8 g [0.52 oz]	6 mL [0.20 fl oz]	40 g [1.4 oz]
8329TCM-50ML	2 Jar kit	121 g [4.26 oz]	50 mL [1.69 fl oz]	200 g [0.44 lb]
8329TCM-200ML	2 Can kit	494 g [1.09 lb]	200 mL [6.76 fl oz]	660 g [1.5 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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