Thermally Conductive Epoxy Adhesive

Description

8329TFF is a thermally conductive, fast-cure two-part epoxy adhesive. It is off-white, smooth, thixotropic, and bonds well to a wide variety of substances. It is also flame retardant, and meets the UL 94V-0 standard. For a 1 mL quantity, a minimal service cure can be achieved in 15 minutes at room temperature, and a full cure in 4 hours.

This product is used to bond heat sinks, LEDs and other heat-generating components in electronic assemblies. It is suitable for use with dual-syringes, mix-tips and automatic dispensing systems.

For a longer working life, use 8329TFM or 8329TFS.

Features and Benefits

- *Thermal conductivity of 0.8 W/(m·K)*
- *1:1 mix ratio*
- *Working life: 4 minutes*
- *Set time: 15 minutes*
- *Cure time: 4 hours at room temperature or 15 minutes at 65 °C (149 °F)*
- *Flame retardant—meets UL 94V-0 standard*
- *Provides strong electrical insulation*
- *Low CTE prior Tg*
- *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]	4 min
Shelf life @22 °C [72 °F]	≥3 y
Set time @22 °C [72 °F]	15 min
Full cure @22 °C [72 °F]	4 h
Full cure @65 °C [149 °F]	15 min
Full cure @80 °C [176 °F]	10 min

Temperature Ranges

Properties	Value
Constant service temperature	-40–150 °C [-40–302 °F]
Maximum intermittent temperature [a)]	175 °C [347 °F]
Storage temperature	22–27 °C [72–81 °F]

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

Cured Properties

Physical Properties	Method	Value [a)]
Color	Visual	Beige to light yellow
Density @26 °C [79 °F]	ASTM D 1475	1.63 g/mL
Hardness	Shore D Durometer	82D
Tensile strength	ASTM D 638-08	13 N/mm^2 [1 900 lb/in^2]
Compressive strength	ASTM D 695-10	65 N/mm^2 [9 500 lb/in^2]
Lap shear strength (stainless steel)	ASTM D 1002	7.1 N/mm^2 [1 000 lb/in^2]
Lap shear strength (aluminum)	ASTM D 1002	8.3 N/mm^2 [1 200 lb/in^2]
Lap shear strength (copper)	ASTM D 1002	18 N/mm^2 [2 500 lb/in^2]
Lap shear strength (brass)	ASTM D 1002	16 N/mm^2 [2 300 lb/in^2]
Lap shear strength (polycarbonate)	ASTM D 1002	1.6 N/mm^2 [230 lb/in^2]
Lap shear strength (ABS)	ASTM D 1002	1.7 N/mm^2 [240 lb/in^2]
Flammability	UL 94	Meets 94 V-0

Note: Specifications are for epoxy samples cured at 22 °C for 24 h.

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

Cured Properties

Electrical Properties	Method	Value
Breakdown voltage @3.0 mm	ASTM D 149	43 800 V [43.8 kV]
Dielectric strength @3.0 mm	ASTM D 149	375 V/mil [14.8 kV/mm]
Breakdown voltage @3.175 mm [1/8"]	Reference fit [a)]	45 900 V [45.9 kV]
Dielectric strength @3.175 mm [1/8"]	Reference fit [a)]	367 V/mil [14.5 kV/mm]
Resistivity	ASTM D 257	7.9 x 10^{12} Ω·cm
Conductivity	ASTM D 257	1.3 x 10^{-13} S/cm
Thermal Properties	**Method**	**Value**
Glass transition temperature (T_g)	ASTM E 3418	25 °C [77 °F]
CTE [b)] prior T_g after T_g	ASTM E 831 ASTM E 831	34 ppm/°C [94 ppm/°F] 146 ppm/°C [294 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	0.8 W/(m·K) 0.7 W/(m·K) 0.7 W/(m·K)
Thermal diffusivity @25 °C [77 °F]	ASTM E 1461 92	0.3 mm^2/s
Specific heat capacity @25 °C [77 °F]	ASTM E 1461 92	1.4 J/(g·K)

Note: Specifications are for epoxy samples cured at 22 °C for 24 h.

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	Beige to light yellow
Viscosity	Thixotropic
Density	1.94 g/mL
Mix ratio by volume	1:1
Mix ratio by weight	1:0.9
Solids content (w/w)	100%

Physical Properties	Part A	Part B
Color	Beige	Beige to light yellow
Viscosity @25 °C [77 °F]	72 000 cP [72 Pa·s] [a)]	110 000 cP [110 Pa·s] [b)]
Density	1.71 g/mL	1.50 g/mL
Odor	Mild	Mercaptan

a) Brookfield viscometer at 5 rpm with spindle RV S92
b) Brookfield viscometer at 2.5 rpm with spindle RV S92

Compatibility

Adhesion—8329TFF 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 8329TFF 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.

Syringe or 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 or syringe. Do not discard cap.
2. Dispense a small amount to ensure even flow of both parts.
3. (Optional) Attach a static mixer to the 8329TFF-50ML.
   a. Dispense and discard 3 to 5 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 4 h.

Heat cure:

- Put in oven at 65 °C [149 °F] for 15 min.
  —OR—
- Put in oven at 80 °C [176 °F] for 10 min.

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
8329TFF-25ML	N/A	N/A
8329TFF-50ML	8DG-50-1-1	8MT-50

Packaging and Supporting Products

Cat. No.	Packaging	Net Volume	Net Weight	Packaged Weight
8329TFF-25ML	Dual syringe	25 mL [0.84 fl oz]	40.1 g [1.41 oz]	95 g [0.21 lb]
8329TFF-50ML	Dual cartridge	45 mL [1.52 fl oz]	72.3 g [2.55 oz]	125 g [0.28 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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Disclaimer

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