

Description

The 8329TFM *Medium Cure Thermal Conductive Adhesive, Flowable* is a two-part, smooth, dark grey, flowable paste that cures to form a hard and durable polymer that is extremely thermally conductive, yet electrically insulating. It is filled with thermally conductive ceramic powders for excellent thermal conductivity. It bonds well to metals, ceramics, glass, and most plastics used in electronic assemblies.

It has a convenient 1-to-1 mix ratio, a 45 minutes working life, and a moderate cure rate. It can be cured in 24 hours at room temperature or 90 minutes at 80 °C.

This product comes packaged in a 25 mL manual dual syringe or a 50 mL industrial, dual-cartridge for use with a dispensing gun and static mixing tips.

Applications & Usages

The 8329TFM epoxy is used for bonding heat sinks, LED's, and other heat generating components in electronic assemblies. It is suitable for use in manufacturing operations including automatic dispensing applications. It is also useful in the maintenance, repair, and hobbyist sectors. Use it when a flowable adhesive with excellent thermal conductivity and a moderate working life is required.

Benefits and Features

- **Thermal conductivity: 1.14 W/(m·K)**
- **1:1 mix ratio**
- **Working life of 45 minutes**
- **Cure time of 150 minutes at 65 °C or 24 hours at room temperature**
- **Good adhesive strength**
- **Strong water and chemical resistance to brine, acids, bases, and aliphatic hydrocarbons**
- **Suitable for automatic dispensing**
- **Room temperature storage**

ENVIRONMENT

- ✓ RoHS
- ✓ REACH compliant

Usage Parameters

<i>Properties</i>	<i>Value</i>
Working Time ^{a)}	45 min
Full Cure @25 °C [77 °F]	24 h
Full Cure @65 °C [149 °F]	150 min
Full Cure @80 °C [176 °F]	60 min
Full Cure @100 °C [212 °F]	30 min

a) Working time for 100 g and room temperature.

Temperature Ranges

<i>Properties</i>	<i>Value</i>
Constant Service Temperature	-40 to 150 °C [-40 to 302 °F]
Intermittent Temp. Limits ^{b)}	-50 to 175 °C [-58 to 347 °F]
Storage Temperature of Unmixed Parts	22 to 27 °C [72 to 81 °F]

b) Withstand temperatures the temperature extremes that can be withstood for a short period of times.



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Properties of Cured 8329TFM

<i>Physical Properties</i>	<i>Method</i>	<i>Value</i> ^{a)}
Color	Visual	Black
Density	ASTM D 1475	2.18 g/mL
Hardness	Shore D durometer	72D
Tensile Strength	ASTM D 638	4.5 N/mm ² [650 lb/in ²]
Young's Modulus	"	0.238 GPa [34 500 lb/in ²]
Compressive Strength	ASTM D 695	44 N/mm ² [6 400 lb/in ²]
Lap Shear Strength (Stainless Steel)	ASTM D 1002	9 N/mm ² [1 300 lb/in ²]
Lap Shear Strength (Aluminum)	"	6.6 N/mm ² [950 lb/in ²]
Lap Shear Strength (Copper)	"	8.0 N/mm ² [1 100 lb/in ²]
Lap Shear Strength (Brass)	"	7.8 N/mm ² [1 100 lb/in ²]
Lap Shear Strength (ABS)	"	2.1 N/mm ² [300 lb/in ²]
Lap Shear Strength (Polycarbonate)	"	0.75 N/mm ² [110 lb/in ²]
<i>Electric Properties</i>	<i>Method</i>	<i>Value</i>
Breakdown Voltage	ASTM D 149	16 500 V
Dielectric Strength	"	180 V/mil 7.3 kV/mm
Breakdown Voltage @3.175 mm [1/8"]	Reference fit ^{a)}	19 500 V
Dielectric Strength	"	160 V/mil 6.1 kV/mm
Volume Resistivity	ASTM D 257	9 x 10 ¹² Ω·cm
Surface Resistivity	"	Not available
Dielectric Dissipation & Constant		<i>dissipation, D</i> <i>constant, k'</i>
Dissipation & Constant	ASTM D 150-98	Not available Not available
Insulating		Yes
Conductive		No
<i>Thermal Properties</i>	<i>Method</i>	<i>Value</i>
Thermal Conductivity @25 °C [77 °F]	ASTM E 1461	1.14 W/(m·K)
@50 °C [122 °F]	"	1.13 W/(m·K)
@100 °C [212 °F]	"	1.03 W/(m·K)
Thermal Diffusivity @25 °C [77 °F]	ASTM E 1461	0.49 mm ² /s
Specific Heat @25 °C [77 °F]	"	1.06 J/(g·K)
@50 °C [122 °F]	"	1.24 J/(g·K)
@100 °C [212 °F]	"	1.27 J/(g·K)
Glass Transition Temperature (T _g)	ASTM D 3418	76 °C [170 °F]
CTE ^{c)} Prior T _g	ASTM E 831	67 ppm/°C
CTE ^{c)} After T _g	ASTM E 831	125 ppm/°C

Note: Specifications are for epoxy samples that were cured at 65 °C for 150 minutes. Additional curing time at room temperature was given to allow for optimum curing.

a) N/mm² = MPa; lb/in² = psi

b) To allow comparison between products, the Tautscher equation was fitted to 3 experimental dielectric strengths and extrapolated to 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



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Properties of Uncured 8329TFM

<i>Physical Property</i>	<i>Mixture (1A:1B)</i>	
Color	Black	
Density	2.19 g/mL	
Mix Ratio by Volume (A:B)	1:00:1.00	
Mix Ratio by Weight (A:B)	1.00:0.96	
Solids Content (w/w)	100%	
<i>Physical Property</i>	<i>Part A</i>	<i>Part B</i>
Color	Black	Dark Grey
Density	2.23 g/mL	2.18 g/mL
Flash Point	>149 °C [300 °F]	>43 °C [109 °F]
Viscosity	Thixotropic paste	Thixotropic paste

Principal Components

Name	CAS Number
Part A: Epoxy Resin	28768-32-3
Aluminum Oxide	1344-28-1
Zinc Oxide	1314-13-2
Part B: Aluminum Oxide	1344-28-1
Zinc Oxide	1314-13-2
Nonylphenol	25154-52-3

Compatibility


Chemical—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.

Adhesion—As seen in the substrate adhesion table, the 8329TFM epoxy adheres to many materials found on printed circuit assemblies; however, contaminants like water, oil, and greasy flux residues may affect adhesion. If contamination is present, clean the printed circuit assembly with electronic cleaner such as MG Chemicals 4050 Safety Wash, 406B Superwash, or 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.

Substrate Adhesion in Decreasing Order

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

a) Does not bond to polypropylene or Teflon

Storage

Store between 22 and 45 °C [72 and 113 °F] in dry area away from sunlight. Because some of the components are sensitive to air, always recap firmly when not in use to maximize shelf life.

Health, Safety, and Environmental Awareness

Please see the 8329TFM **Safety Data Sheet** (SDS) parts A and B for more details on transportation, storage, handling and other security guidelines.

Health and Safety: The 8329TFM parts can ignite if the liquid is both heated and exposed to flames.

Wear safety glasses or goggles and disposable polyvinyl chloride, neoprene, or nitrile gloves while handling liquids. Part B in may cause eye damage. Skin irritation and sensitization may occur if exposed over a long period of time. The epoxy will not wash off once cured. Wash hands thoroughly after use or if skin contact occurs. Do not ingest.

Use in well-ventilated area since vapors are strong smelling and may cause irritation of the respiratory tract in susceptible individuals.

The uncured product contains unbound marine pollutants. Dispose of material according to local, regional, national, and international regulation. The cured product is not expected to be environmentally hazardous.

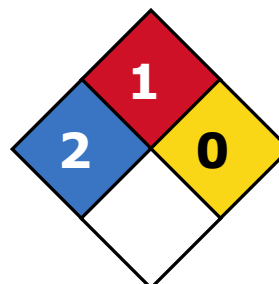
The cured epoxy adhesive presents no known hazard.

Part A

HMIS® RATING

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

NFPA® 704 CODES

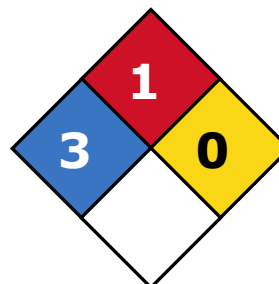


Part B

HMIS® RATING

HEALTH:	* 3
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. For mixing quantities that are less than 1 mL in size or for stricter stoichiometry control, mix by weight ratio instead (requires a high precision balance). Heat cure is recommended to get the best possible conductivity.

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

1. Remove cap or cover.
2. Measure **one** part by volume of **A**.
3. Measure **one** part by volume of **B**.
4. Thoroughly mix the parts together with a stir stick until homogeneous.
5. Apply to with an appropriate sized stick for the application area.

NOTE: Remember to recap the syringe or container promptly after use.

TIP: You may preheat part A and part B to increase the flow and improve air release, but this will decrease pot life. Note that the viscosities of the parts also decreases with mixing, so they will be most liquid-like and easily dispensed with constant mixing.



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To heat cure the 8329TFM epoxy

Put in oven at 65 °C [149 °F] for 150 minutes.

TIP: Hair dryers are normally rated not to exceed 60 °C, so they can generally be used to accelerate the cure.

ATTENTION: Keep the curing temperature well below temperature limit of heat sensitive components that may be present. As a guideline, remember that commercial grade devices normally can be safely operated up to 70 °C, industrial grade up to 85 °C, and military grade up to 175 °C.

ATTENTION: Heat guns can easily exceed the temperature limits for your assembly: they should not be used.

To room temperature cure the 8329TFM epoxy

Let stand for 24 hours.

TIP: While the product can be cured at room temperature, the better conductive performance is achieved with heat curing.

Packaging and Supporting Products

<i>Cat. No.</i>	<i>Packaging</i>	<i>Net Volume</i>		<i>Net Weight</i>	
8329TFM-25ML	Dual Syringe	25 mL	0.8 fl oz	55 g	1.9 oz
8329TFM-50ML	Dual Cartridge	50 mL	1.6 fl oz	110 g	3.88 oz

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

M.G. Chemicals Ltd. warrants this product for 12 months from the date of purchase by the end user. *M.G. Chemicals Ltd.* makes no claims as to shelf life of this product for the warranty. The liability of *M.G. Chemicals Ltd.* whether based on its warranty, contracts, or otherwise shall in no case include incidental or consequential damage.

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