

Description

This is a two-part, smooth, dark grey paste that cures to form a hard, 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 and a 4 hours working life. With this long work life, the mixed adhesive can essentially act like a one-part adhesive for the duration of a work shift. Unlike one-part adhesives, however, it does not require high curing temperatures or frozen storage, and it has a very long shelf life.

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 8329TFS 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 maintenance, repair, and hobbyist sectors. Use it when a flowable adhesive with excellent thermal conductivity and a long working life is required.

Benefits and Features

- **Thermal conductivity: 1.22 W/(m·K)**
- **1:1 mix ratio by volume**
- **Working life of 4 hours**
- **Cure time of 1 hour 20 minutes at 80 °C or 96 hours at room temperature**
- **Good adhesive strength**
- **Strong water and chemical resistance to brine, acids, bases, and aliphatic hydrocarbons**
- **Suitable for automatic dispensing**
- **Stores and ships at room temperature**

ENVIRONMENT

- ✓ RoHS
- ✓ REACH compliant

Usage Parameters

<i>Properties</i>	<i>Value</i>
Working Life ^{a)}	4 h
Full Cure @25 °C [77 °F]	96 h
Full Cure @65 °C [149 °F]	4 h
Full Cure @80 °C [176 °F]	1 h 20 min

a) Pot life for 100 g and room temperature.

Temperature Ranges

<i>Properties</i>	<i>Value</i>
Constant Service Temperature	-40 to 165 °C [-40 to 329 °F]
Intermittent Temp. Extrema ^{b)}	-50 to 175 °C [-58 to 347 °F]
Storage Temperature of Unmixed Parts	22 to 27 °C [72 to 81 °F]

b) The temperature extremes that can be withstood for a short period of times.



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8329TFS

Properties of Cured 8329TFS

<i>Physical Properties</i>	<i>Method</i>	<i>Value</i> ^{a)}	
Color	Visual	Dark grey	
Density	ASTM D 1475	2.08 g/cm ³	
Hardness	Shore D durometer	68D	
Tensile Strength	ASTM D 638	4.2 N/mm ²	[600 lb/in ²]
Young's Modulus	ASTM D 638	0.028 GPa	[4 100 lb/in ²]
Compressive Strength	ASTM D 695	42 N/mm ²	[6 000 lb/in ²]
Lap Shear Strength (Stainless Steel)	ASTM D 1002	5.0 N/mm ²	[720 lb/in ²]
Lap Shear Strength (Aluminum)	"	6.3 N/mm ²	[910 lb/in ²]
Lap Shear Strength (Copper)	"	6.9 N/mm ²	[1 000 lb/in ²]
Lap Shear Strength (Brass)	"	6.4 N/mm ²	[930 lb/in ²]
Lap Shear Strength (ABS)	"	1.5 N/mm ²	[220 lb/in ²]
Lap Shear Strength (Polycarbonate)	"	1.8 N/mm ²	[260 lb/in ²]
<i>Electric Properties</i>	<i>Method</i>	<i>Value</i>	
Breakdown Voltage	ASTM D 149	19 800 V	
Dielectric Strength	"	220 V/mil	8.5 kV/mm
Breakdown Voltage @3.175 mm [1/8"]	Reference fit ^{a)}	23 300 V	
Dielectric Strength	"	186 V/mil	7.3 kV/mm
Volume Resistivity	ASTM D 257	1 x 10 ¹³ Ω·cm	
Dielectric Dissipation & Constant	ASTM D 150-98	<i>dissipation, D</i>	<i>constant, k'</i>
Dissipation & Constant		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	1.22 W/(m·K)	
@50 °C [122 °F]	"	1.24 W/(m·K)	
@100 °C [212 °F]	"	1.14 W/(m·K)	
Thermal Diffusivity @25 °C [77 °F]	"	0.58 mm ² /s	
Specific Heat @25 °C [77 °F]	"	1.01 J/(g·K)	
@50 °C [122 °F]	"	1.16 J/(g·K)	
@100 °C [212 °F]	"	1.24 J/(g·K)	
Glass Transition Temperature (T _g)	ASTM D 3481	9 °C	
CTE ^{c)} Prior T _g	ASTM E 831	64 ppm/°C	
CTE ^{c)} After T _g	ASTM E 831	159 ppm/°C	

Note: Specifications are for epoxy samples that were cured at 80 °C for 80 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 8329TFS

<i>Physical Property</i>	<i>Mixture (1A:1B)</i>	
Color	Black	
Density	2.07 g/mL	
Mix Ratio by Volume (A:B)	1:1	
Mix Ratio by Weight (A:B)	1:0.96	
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	1.96 g/mL
Flash Point	>149 °C [300 °F]	>43 °C [109 °F]
Viscosity	Thixotropic paste	Thixotropic paste

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 8329TFS 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.




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Substrate Adhesion in Decreasing Order

<i>Physical Properties</i>	<i>Adhesion</i>
Aluminum	Stronger  Weaker
Steel	
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 8329TFS **Safety Data Sheet** (SDS) parts A and B for more details on transportation, storage, handling and other security guidelines.

Health and Safety: The 8329TFS 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.

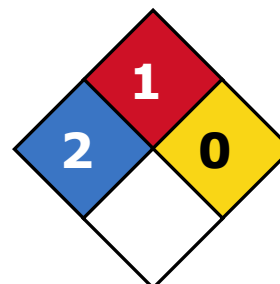
The cured epoxy adhesive presents no known hazard.

Part A

HMIS® RATING

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

NFPA® 704 CODES

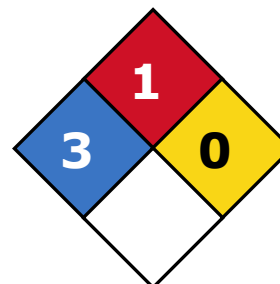


Part B

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 8329TFS epoxy

Put in oven at 80 °C [176 °F] for 80 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 8329TFS epoxy

Let stand for 96 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>	
8329TFS-25ML	Dual Syringe	25 mL	0.8 fl oz	52.5 g	1.85 oz
8329TFS-50ML	Dual Cartridge	50 mL	1.6 fl oz	105 g	3.7 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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