

Description

This is a two-part, smooth, off-white paste that cures to form a hard, durable polymer that is extremely thermally conductive, yet electrically insulating. It is extremely viscous because it is highly filled with thermally conductive ceramic powders for maximum thermal conductivity. It adheres strongly to metals and glass, and it adheres well to most plastics used in electronic assemblies.

It has a convenient 1-to-1 mix ratio, a short 4 minutes working life, and a rapid cure rate. For a 1 mL quantity, a minimal service cure can be achieved in 15 minutes at room temperature, and a full cure in 3 hours. It is also flame retardant adhesive, meeting the UL 94V-0 specifications.

It is available in a 50 mL industrial, dual-cartridge for use with our 8DG-50-1-1 dispensing gun (static mixer not available) or a pneumatic dispenser.

Applications & Usages

This product is designed to bond heat sinks, LED's, and other heat generating components in electronic assemblies. It is suitable for the manufacturing and repair sectors, as well as for hobbyists. Use it when a thixotropic adhesive paste with maximum thermal conductivity and an extremely fast cure time is required. For automatic dispensing applications, use the 8329TFF, which offers a lower viscosity at the cost of slightly lower thermal conductivity.

Benefits and Features

- **Thermal conductivity: 1.0 W/(m·K)**
- **1:1 mix ratio**
- **Working life: 4 minutes**
- **Set time @25 °C of 15 minutes**
- **Cure time: 3 hours at 25 °C or 15 minutes at 65 °C**
- **Flame retardant—meets UL 94V-0 standard**
- **Good adhesion to most electronic substrates**
- **Good tensile strength**
- **Strong resistance to water, brine, acids, bases, and aliphatic hydrocarbons**
- **Room temperature storage**

ENVIRONMENT

- ✓ RoHS
- ✓ REACH compliant

Usage Parameters

<i>Properties</i>	<i>Value</i>
Working Life	4 min
Set time	15 min
Full Cure @25 °C [77 °F]	3 h
Full Cure @65 °C [149 °F]	15 min

Temperature Ranges

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

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

Properties of Cured 8329TCF

<i>Physical Properties</i>	<i>Method</i>	<i>Value</i> ^{a)}
Color	Visual	Off white
Density	MG-Met-143	1.75 g/cm ³
Hardness	Shore D durometer	82D
UL Flammability Rating	UL 746E	Meets UL 94-V0
Tensile Strength	ASTM D 638	12.8 N/mm ² [1 860 lb/in ²]
Young's Modulus	ASTM D 638	1.7 GPa [250 000 lb/in ²]
Compressive Strength	ASTM D 695	36 N/mm ² [5 200 lb/in ²]
Lap Shear Strength (Stainless Steel)	ASTM D 1002	11 N/mm ² [1 600 lb/in ²]
Lap Shear Strength (Aluminum)	"	8.2 N/mm ² [1 200 lb/in ²]
Lap Shear Strength (Copper)	"	11 N/mm ² [1 600 lb/in ²]
Lap Shear Strength (Brass)	"	10 N/mm ² [1 500 lb/in ²]
Lap Shear Strength (ABS)	"	1.5 N/mm ² [210 lb/in ²]
Lap Shear Strength (Polycarbonate)	"	2.6 N/mm ² [380 lb/in ²]
<i>Electric Properties</i>	<i>Method</i>	<i>Value</i>
Breakdown Voltage @2.19 mm	ASTM D 149	35.3 kV
Dielectric Strength @2.19 mm	"	16.2 kV/mm [412 V/mil]
Breakdown Voltage @3.175 mm [1/8"]	Reference fit ^{a)}	42.7 kV
Dielectric Strength	"	13.1 kV/mm [342 V/mil]
Volume Resistivity	ASTM D 257	3 x 10 ¹³ 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

a) 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).



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<i>Thermal Properties</i>	<i>Method</i>	<i>Value</i>
Thermal Conductivity @25 °C [77 °F]	ASTM E 1461	1.02 W/(m·K)
@50 °C [122 °F]	"	0.97 W/(m·K)
@100 °C [212 °F]	"	0.92 W/(m·K)
Thermal Diffusivity @25 °C [77 °F]	ASTM E 1461	0.435 mm ² /s
Specific Heat @25 °C [77 °F]	"	1.32 J/(g·K)
@50 °C [122 °F]	"	1.60 J/(g·K)
@100 °C [212 °F]	"	1.69 J/(g·K)
Glass Transition Temperature (T _g)	ASTM D 3418	88 °C [175 °F]
CTE ^{b)} Prior T _g	ASTM E 831	23 ppm/°C
CTE ^{b)} After T _g	ASTM E 831	107 ppm/°C

Note: Specifications are for epoxy samples that were cured at room temperature for 24 hours.

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

Properties of Uncured 8329TCF

<i>Physical Property</i>	<i>Mixture (1A:1B)</i>	
Color	Off white	
Mix Ratio by Volume (A:B)	1:0:1.0	
Mix Ratio by Weight (A:B)	1.0:0.9	
Solids Content (w/w)	100%	
<i>Physical Property</i>	<i>Part A</i>	<i>Part B</i>
Color	White	Slight Yellow
Density	1.88 g/mL	1.59 g/mL
Flash Point	>149 °C [300 °F]	>149 °C [300 °F]
Viscosity	Thixotropic paste	Thixotropic paste

Principal Components

Name	CAS Number
Part A: Epoxy Resin	28768-32-3
Aluminum Trihydrate	21645-51-2
Zinc Oxide	1314-13-2
Part B: Aluminum Trihydrate	21645-51-2
Pentaerythritol, propoxylated	9051-49-4
3-mercaptopropane-1,2-diol	96-27-5



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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 8329TCF 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	<p>Stronger</p>  <p>Weaker</p>
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 8329TCF **Safety Data Sheet** (SDS) parts A and B for more details on transportation, storage, handling and other security guidelines.

Health and Safety: The 8329TCF 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.

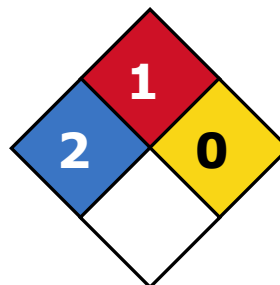
The cured epoxy adhesive presents no known hazard.

Part A

HMIS® RATING

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

NFPA® 704 CODES

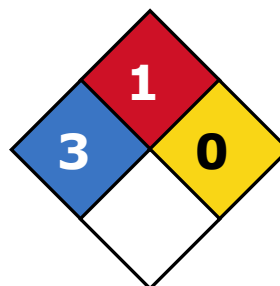


Part B

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.

To heat cure the 8329TCF epoxy

Put in oven at 65 °C [149 °F] for 15 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 8329TCF epoxy

Let stand for 3 hours.

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



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Packaging and Supporting Products

<i>Cat. No.</i>	<i>Packaging</i>	<i>Dispensing Gun</i>	<i>Net Weight</i>	
8329TCF-50ML	Dual Cartridge	8DG-50-1-1	86 g	35 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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