

Thermally Conductive Epoxy Adhesive

Description

8329TCS is a thermally conductive two-part epoxy adhesive with a long working life. 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.

8329TCS has been designed for maximum thermal conductivity with a high viscosity. For a lower viscosity, use 8329TFS. For a shorter working life, use 8329TCF or 8329TCM.

Features and Benefits

- Thermal conductivity of 1.4 W/(m·K)
- 1:1 mix ratio
- Working life: 4 hours
- Cure time: 1 hour at 80 °C (176 °F)
- Provides strong electrical insulation
- High tensile strength
- Strong resistance to humidity, salt water, mild bases, and aliphatic hydrocarbons
- Shelf life: ≥ 3 years
- RoHS 3 compliant
- NASA low outgassing approved

Usage Parameters

Properties	Value
Working life @22 °C [72 °F]	4 h
Shelf life @22 °C [72 °F]	≥3 y
Full cure @22 °C [72 °F]	Heat cure only
Full cure @65 °C [149 °F]	2 h
Full cure @80 °C [176 °F]	1 h
Full cure @100 °C [212 °F]	20 min

Temperature Ranges

Properties	Value
Constant service temperature	-40 to 150 °C [-40 to 302 °F]
Maximum intermittent temperature ^{a)}	200 °C [302 °F]
Storage temperature	22 to 27 °C [72 to 81 °F]

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

Cured Properties

Physical Properties	Method	Value ^{a)}
Color	Visual	Dark grey
Density @25 °C [77 °F]	ASTM D 1475	2.17 g/mL
Hardness	Shore D Durometer	62D
Tensile strength	ASTM D 638	11 N/mm ² [1 700 lb/in ²]
Young's modulus	ASTM D 638	310 N/mm ² [45 000 lb/in ²]
Elongation %	ASTM D 638	7%
Compressive strength	ASTM D 695	43 N/mm ² [6 200 lb/in ²]
Lap shear strength (stainless steel)	ASTM D 1002	4.7 N/mm ² [680 lb/in ²]
Lap shear strength (aluminum)	ASTM D 1002	4.4 N/mm ² [630 lb/in ²]
Lap shear strength (copper)	ASTM D 1002	5.0 N/mm ² [720 lb/in ²]
Lap shear strength (brass)	ASTM D 1002	5.6 N/mm ² [820 lb/in ²]
Lap shear strength (polycarbonate)	ASTM D 1002	1.0 N/mm ² [140 lb/in ²]
Lap shear strength (ABS)	ASTM D 1002	1.3 N/mm ² [180 lb/in ²]
Water absorption (relative mass change)	ASTM D 570	0.23%
Outgassing (total mass loss) @125 °C [257 °F] for 24 h	ASTM E 595	0.80%
Water vapor regain	ASTM E 595	0.13%
Collected volatile condensable materials	ASTM E 595	0.07

Note: Specifications are for epoxy samples cured at 80 °C for 1 h and conditioned at ambient temperature and humidity.

a) N/mm² = mPa; lb/in² = psi

Cured Properties

Electrical Properties	Method	Value
Breakdown voltage @4 mm	ASTM D 149	26 300 V [26.3 kV]
Dielectric strength @4 mm	ASTM D 149	168 V/mil [6.6 kV/mm]
Breakdown voltage @3.175 mm [1/8"]	Reference fit ^{a)}	23 900 V [23.9 kV]
Dielectric strength @3.175 mm [1/8"]	Reference fit ^{a)}	165 V/mil [7.5 kV/mm]
Volume resistivity	ASTM D 257	$2 \times 10^{13} \Omega \cdot \text{cm}$
Volume conductivity	ASTM D 257	$5 \times 10^{-14} \text{ S/cm}$
Dielectric dissipation, D @1 MHz	ASTM D 150-11	0.024
Dielectric constant, k' @1 MHz	ASTM D 150-11	5.48
Thermal Properties	Method	Value
Glass transition temperature (T _g)	ASTM E 3418	8.8 °C [48 °F]
CTE ^{b)} prior T _g after T _g	ASTM E 831 ASTM E 831	36 ppm/°C [97 ppm/°F] 173 ppm/°C [344 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) 1.4 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 temperature (HDT)	ASTM D 648	30 °C [86 °F]

Note: Specifications are for epoxy samples cured at 80 °C for 1 h and conditioned at ambient temperature and humidity.

a) To allow comparison between products, the dielectric strength was recalculated with the Tauscher 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	2.27 g/mL
Mix ratio by volume	1:1
Mix ratio by weight	0.95:1
Solids content (w/w)	100%

Physical Properties	Part A	Part B
Color	Dark grey	Medium grey
Viscosity @25 °C [77 °F]	970 000 cP [970 Pa·s] ^{a)}	2 000 000 cP [2 000 Pa·s] ^{b)}
Density	2.25 g/mL	2.28 g/mL
Odor	Mild	Mercaptan

a) Brookfield viscometer at 4 rpm with spindle RV E95

b) Brookfield viscometer at 2 rpm with spindle RV E95

Compatibility

Adhesion—8329TCS 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 8329TCS 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 0.95 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:

- Heat cure only

Heat cure:

- Put in oven at 65 °C [149 °F] for 2 h.
—OR—
- Put in oven at 80 °C [176 °F] for 1 h.
—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
8329TCS-6ML	2 Syringe kit	13.8 g [0.47 oz]	6 mL [0.20 fl oz]	40 g [1.4 oz]
8329TCS-50ML	2 Jar kit	116 g [4.09 oz]	50 mL [1.69 fl oz]	0.19 kg [0.4 lb]
8329TCS-200ML	2 Can kit	465 g [1.0 lb]	200 mL [6.76 fl oz]	0.62 kg [1.4 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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