

## 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 T<sub>g</sub>
- 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 <sup>a)</sup> | 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 <sup>a)</sup>                               |
|--------------------------------------|-------------------|---------------------------------------------------|
| 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 <sup>2</sup> [1 900 lb/in <sup>2</sup> ]  |
| Compressive strength                 | ASTM D 695-10     | 65 N/mm <sup>2</sup> [9 500 lb/in <sup>2</sup> ]  |
| Lap shear strength (stainless steel) | ASTM D 1002       | 7.1 N/mm <sup>2</sup> [1 000 lb/in <sup>2</sup> ] |
| Lap shear strength (aluminum)        | ASTM D 1002       | 8.3 N/mm <sup>2</sup> [1 200 lb/in <sup>2</sup> ] |
| Lap shear strength (copper)          | ASTM D 1002       | 18 N/mm <sup>2</sup> [2 500 lb/in <sup>2</sup> ]  |
| Lap shear strength (brass)           | ASTM D 1002       | 16 N/mm <sup>2</sup> [2 300 lb/in <sup>2</sup> ]  |
| Lap shear strength (polycarbonate)   | ASTM D 1002       | 1.6 N/mm <sup>2</sup> [230 lb/in <sup>2</sup> ]   |
| Lap shear strength (ABS)             | ASTM D 1002       | 1.7 N/mm <sup>2</sup> [240 lb/in <sup>2</sup> ]   |
| Flammability                         | UL 94             | Meets 94 V-0                                      |

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

**a)** N/mm<sup>2</sup> = mPa; lb/in<sup>2</sup> = 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 <sup>a)</sup>                        | 45 900 V [45.9 kV]                               |
| Dielectric strength @3.175 mm [1/8"]                                       | Reference fit <sup>a)</sup>                        | 367 V/mil [14.5 kV/mm]                           |
| Resistivity                                                                | ASTM D 257                                         | $7.9 \times 10^{12} \Omega \cdot \text{cm}$      |
| Conductivity                                                               | ASTM D 257                                         | $1.3 \times 10^{-13} \text{ S/cm}$               |
| Thermal Properties                                                         | Method                                             | Value                                            |
| Glass transition temperature ( $T_g$ )                                     | ASTM E 3418                                        | 25 °C [77 °F]                                    |
| CTE <sup>b)</sup> prior $T_g$<br>after $T_g$                               | ASTM E 831<br>ASTM E 831                           | 34 ppm/°C [94 ppm/°F]<br>146 ppm/°C [294 ppm/°F] |
| Thermal conductivity @25 °C [77 °F]<br>@50 °C [222 °F]<br>@100 °C [212 °F] | ASTM E 1461 92<br>ASTM E 1461 92<br>ASTM E 1461 92 | 0.8 W/(m·K)<br>0.7 W/(m·K)<br>0.7 W/(m·K)        |
| Thermal diffusivity @25 °C [77 °F]                                         | ASTM E 1461 92                                     | 0.3 mm <sup>2</sup> /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  $\times 10^{-6}$  = unit/unit/°C  $\times 10^{-6}$

## 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] <sup>a)</sup> | 110 000 cP [110 Pa·s] <sup>b)</sup> |
| 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             |                                                                                      |
| Polypropylene       |                                                                                      |
|                     | Weaker                                                                               |
|                     | 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](http://www.mgchemicals.com).

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## Disclaimer

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