

## Silver Conductive Epoxy Adhesive

### Description

8330S is an electrically conductive, silver-filled two-part epoxy adhesive with a long working life. It is smooth, non-sagging, thixotropic, and bonds well to a wide variety of substrates.

It can be used as a solder replacement for bonding heat-sensitive electronic components, or for making conductive connections where soldering is not an option, such as when bonding to glass, soft metals, or plastics.

8330S is highly filled to maximize electrical conductivity. For a more economical version, use 8331S. For a shorter working life and room temperature cure, use 8330.

### Features and Benefits

- Resistivity of  $0.0007 \Omega \cdot \text{cm}$
- Thermal conductivity of  $2.4 \text{ W}/(\text{m} \cdot \text{K})$
- 1:1 mix ratio
- Working life: 4 hours
- Cure time: 2 hours at  $65 \text{ }^\circ\text{C}$  ( $149 \text{ }^\circ\text{F}$ )
- Good tensile strength
- High compressive strength
- Strong resistance to humidity, salt water, mild bases, and aliphatic hydrocarbons
- Shelf life: 3 years at room temperature
- RoHS 3 compliant

## Usage Parameters

Properties	Value
Working life @22 °C [72 °F] <sup>a)</sup>	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

a) Working life assumes 5 g at room temperature.

## Temperature Ranges

Properties	Value
Constant service temperature	-40 to 150 °C [-40 to 302 °F]
Storage temperature	16 to 27 °C [61 to 81 °F]

## Cured Properties

Physical Properties	Method	Value <sup>a)</sup>
Color	Visual	Silver grey
Density @26 °C [79 °F]	ASTM D 1475	2.8 g/mL
Hardness	Shore D Durometer	73D
Tensile strength	ASTM D 638	9.0 N/mm <sup>2</sup> [1 300 lb/in <sup>2</sup> ]
Elongation	ASTM D 638	7.8%
Young's modulus	ASTM D 638	220 N/mm <sup>2</sup> [32 000 lb/in <sup>2</sup> ]
Compressive strength	ASTM D 695	36 N/mm <sup>2</sup> [5 200 lb/in <sup>2</sup> ]
Lap shear strength (stainless steel 304)	ASTM D 1002	1.3 N/mm <sup>2</sup> [190 lb/in <sup>2</sup> ]
Lap shear strength (aluminum 5052)	ASTM D 1002	2.6 N/mm <sup>2</sup> [380 lb/in <sup>2</sup> ]
Water absorption (relative mass change)	ASTM D 570	0.32%
Outgassing (total mass loss) @125 °C [257 °F] for 24 h	ASTM E 595	0.40%
Water vapor regain	ASTM E 595	0.14%
Collected volatile condensable materials	ASTM E 595	0.03%

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

**a)** N/mm<sup>2</sup> = mPa; lb/in<sup>2</sup> = psi

## Cured Properties

Electrical Properties	Method	Value
Volume resistivity	Method 5011.5 in MIL-STD-883H	0.0007 $\Omega$ ·cm
Volume conductivity	Method 5011.5 in MIL-STD-883H	1 400 S/cm
Thermal Properties	Method	Value
Glass transition temperature ( $T_g$ )	ASTM E 3418	34 °C [93 °F]
CTE <sup>a)</sup> prior $T_g$ after $T_g$	ASTM E 831 ASTM E 831	97 ppm/°C [206 ppm/°F] 208 ppm/°C [406 ppm/°F]
Thermal conductivity @25 °C [77 °F] @50 °C [122 °F] @100 °C [212 °F]	ASTM E 1461 ASTM E 1461 ASTM E 1461	2.4 W/(m·K) 3.3 W/(m·K) 2.5 W/(m·K)
Thermal diffusivity @25 °C [77 °F]	ASTM E 1461 92	1.2 mm <sup>2</sup> /s
Specific heat capacity @25 °C [77 °F]	ASTM E 1461 92	0.6 J/(g·K)

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

**a)** Coefficient of Thermal Expansion (CTE) units are in ppm/°C = in/in/°C × 10<sup>-6</sup> = unit/unit/°C × 10<sup>-6</sup>

## Uncured Properties

Physical Properties	Mixture (A:B)
Color	Silver grey
Density	3.4 g/mL
Mix ratio by volume	1:1
Mix ratio by weight	1.1:1
Solids content (w/w)	100%

Physical Properties	Part A	Part B
Color	Silver grey	Silver grey
Viscosity @25 °C [77 °F]	3 000 000 cP [3 000 Pa·s] <sup>a)</sup>	8 600 000 cP [8 600 Pa·s] <sup>b)</sup>
Density	3.4 g/mL	2.9 g/mL
Odor	Mild	Amine

**a)** Brookfield viscometer at 2 rpm with spindle RV S96

**b)** Brookfield viscometer at 1 rpm with spindle RV S96

## Compatibility

**Adhesion**—8330S 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 16 and 27 °C [61 and 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
Aluminum	Stronger
Steel	↑ ↓
Fiberglass	
Wood	
Paper, Fiber	
Glass	
Rubber	↓
Polycarbonate	
Acrylic	Weaker
Polypropylene	Does not bond

## Health and Safety

Please see the 8330S 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:

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.

### Can or jar:

1. Stir each part individually to re-incorporate material that may have separated during storage.
2. Measure 1.1 part 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.

## Cure Instructions

### Room temperature cure:

Do NOT cure at room temperature. This product will only cure at elevated temperatures.

### 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.

## Packaging and Supporting Products

Cat. No.	Packaging	Net Weight	Packaged Weight
8330S-21G	2 Syringe kit	18.7 g [0.66 oz]	40 g [1.4 oz]
8330S-50ML	2 Jar kit	156 g [5.51 oz]	220 g [0.5 lb]
8330S-200ML	2 Can kit	625 g [1.38 lb]	710 g [1.6 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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