

## Silver Conductive Epoxy Adhesive

### Description

8331S 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.

8331S has been formulated to be economical. For a higher fill version that maximizes conductivity, use 8330S. For a shorter working life and room temperature cure, use 8331.

### Features and Benefits

- *Resistivity of 0.006  $\Omega$ -cm*
- *Thermal conductivity of 1.3 W/(m·K)*
- *1:1 mix ratio*
- *Working life: 4 hours*
- *Cure time: 2 hours at 65 °C (149 °F)*
- *High tensile strength*
- *Excellent 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
Full cure @100 °C [212 °F]	30 min

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 @25 °C [77 °F]	ASTM D 1475	2.2 g/mL
Hardness	Shore D Durometer	60D
Tensile strength	ASTM D 638	14 N/mm <sup>2</sup> [2 000 lb/in <sup>2</sup> ]
Elongation	ASTM D 638	5.3%
Young's Modulus	ASTM D 638	760 N/mm <sup>2</sup> [110 000 lb/in <sup>2</sup> ]
Lap shear strength (stainless steel 304)	ASTM D 1002	1.1 N/mm <sup>2</sup> [160 lb/in <sup>2</sup> ]
Lap shear strength (aluminum 5052)	ASTM D 1002	4.8 N/mm <sup>2</sup> [690 lb/in <sup>2</sup> ]
Compressive strength	ASTM D 695	65 N/mm <sup>2</sup> [9 400 lb/in <sup>2</sup> ]
Water absorption (relative mass change)	ASTM D 570	0.12%
Outgassing (total mass loss) @125 °C [257 °F] for 24 h	ASTM E 595	0.43%
Water vapor regain	ASTM E 595	0.27%
Collected volatile condensable materials	ASTM E 595	0.04%

*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 At 65 °C [149 °F] cure	Method 5011.5 in MIL-STD-883H	0.006 Ω·cm
Volume conductivity At 65 °C [149 °F] cure	Method 5011.5 in MIL-STD-883H	167 S/cm
Thermal Properties	Method	Value
Glass transition temperature (T <sub>g</sub> )	ASTM E 3418	34 °C [93 °F]
CTE <sup>a)</sup> prior T <sub>g</sub> after T <sub>g</sub>	ASTM E 831 ASTM E 831	78 ppm/°C [172 ppm/°F] 158 ppm/°C [316 ppm/°F]
Thermal conductivity @25 °C [77 °F]	ASTM E 1461	1.3 W/(m·K)
Thermal diffusivity @25 °C [77 °F]	ASTM E 1461	0.7 mm <sup>2</sup> /s
Specific heat capacity @25 °C [77 °F]	ASTM E 1461	0.8 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	2.5 g/mL
Mix ratio by volume	1:1
Mix ratio by weight	1.2:1
Solids content (w/w)	100%

Physical Properties	Part A	Part B
Color	Silver grey	Silver grey
Viscosity @25 °C [77 °F]	950 000 cP [950 Pa·s] <sup>a)</sup>	6 200 000 cP [6 200 Pa·s] <sup>b)</sup>
Density	2.6 g/mL	2.4 g/mL
Odor	Mild	Amine

**a)** Brookfield viscometer at 2 rpm with spindle RV S94

**b)** Brookfield viscometer at 1.5 rpm with spindle RV S96

## Compatibility

**Adhesion**—8331S 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 8331S 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 1.2 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.  
—OR—
- Put in oven at 100 °C [212 °F] for 30 min.

## Packaging and Supporting Products

Cat. No.	Packaging	Net Weight	Net Volume	Packaged Weight
8331S-15G	2 Syringe kit	14.7 g [0.52 oz]	6 mL [0.20 fl oz]	40 g [1.4 oz]
8331S-50ML	2 Jar kit	123 g [4.34 oz]	50 mL [1.69 fl oz]	190 g [0.4 lb]
8331S-200ML	2 Can kit	491 g [1.08 lb]	200 mL [6.76 fl oz]	650 g [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](http://www.mgchemicals.com).

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## Disclaimer

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