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Laboratory Data Sheet

Product 3880

Electronics Product, June 1999

PRODUCT DESCRIPTION

LOCTITE® Product 3880 is a silver filled, one-component, epoxy adhesive that can be cured by heat. It combines high tensile strength with good electrical and thermal conductivity. The product has particularly good syringe dispensing characteristics and can also be applied by stencil/screen printing.

TYPICAL APPLICATIONS

Bonding of metals, ceramics, rubbers and plastics as used in electronic parts, where good adhesion combined with electrical and thermal conductivity is required. Typical examples are bonding of surface mount devices to flexible or rigid substrates; bonding of semiconductor elements; joining EMI parts; bonding electrodes, lead wires or other connectors that require conductivity.

PROPERTIES OF UNCURED MATERIAL

	Typical Value
Chemical Type	Epoxy
Appearance	Smooth, Silver Paste
Specific Gravity @ 25°C	2.4
Viscosity @ 25°C, cP	75,000 to 200,000
Brookfield RVT Spindle #14-SSA @ 5 rpm	
VOC, ASTM D 3960-81, g/l	74
Moisture, ASTM D4017-81, %	<0.01
Total Volatiles, ASTM D 2369-95, %	3.0
Flash Point, ASTM 93-85, °C (°F)	>93 (>200)
Pensky Marten Closed Cup	

RECOMMENDED CURING CONDITIONS

10 min	@ 125°C
6 min	@ 150°C
3 min	@ 175°C

Note: Sufficient time must be added to allow the bond location to reach the desired cure temperature. Alternate cure profiles may be evaluated.

PHYSICAL PROPERTIES

	Typical Value
*Coefficient of Linear Thermal Expansion, ASTM E 831	
Pre Tg, ppm, mm/mm/°C	45
Post Tg, ppm, mm/mm/°C	220
*Glass Transition Temperature (Tg) via TMA, °C	40
ASTM E 1545-95a	
Water Absorption, ASTM D 570	
2 hour boil - Increased weight, %	<5.0
Soluble matter loss, %	<1.0
Water absorbed, %	<5.0
24 hour RT immersion - Increased weight, %	<1.0
Soluble matter loss, %	<0.02
Water absorbed, %	<1.0
Thermal Conductivity, ASTM F 433, W/m°C	>2.0
Extractable Ionic Content	
Chloride (Cl), ppm	<20
Potassium (K), ppm	<6
Sodium (Na), ppm	<6
Flourine (F), ppm	<6

*Note: Perkin Elmer DMA 7e used in TMA (static) mode with an expansion probe, helium purge, and 5 mN load. Temperature program from -40°C to 225°C at 10°C/min. Each replicate sample was taken through the heat and cool cycle a total of three times. Tg data is taken from the first heat, and CTE data were taken from the second and third heats.

Electrical Properties

Note: All samples cured for 1/2 hour @ 130°C unless otherwise noted.

Volume Resistivity, Mil 883 E, Method 5011, ohm-cm < 0.0008

PERFORMANCE OF CURED MATERIAL

Note: All samples cured for 1 hour @ 130°C unless otherwise noted.

	Typical Value	Range
Tensile Strength, ASTM D 822, psi	5,000	4,000 to 6,000
Modulus, ASTM D 822, psi	450,000	300,000 to 600,000
Elongation, ASTM D 822, %	1.3	1.1 to 1.5
Hardness, ASTM D 2240, Shore D	78	
Shrinkage, ASTM D 792, %	<3	
Shear Strength, ASTM D 1002, psi		
(Cured for 15 minutes @ 130°C)		
Epoxy glass, 0.010" gap	300	
Aluminum, 0.010" gap	600	
Glass, 0.010" gap	300	
Aluminum, 0.005" gap (etched & abraded)	1,000	

GENERAL INFORMATION

This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or other strong oxidizing materials.

For safe handling information on this product, consult the Material Safety Data Sheets, (MSDS).

Directions for use

Allow material to thaw gradually at room temperature before use (approx. 1 hour). The product has a typical work life of 7 days if dispensed directly from the syringe package, and one shift (8 to 12 hours) if applied via stencil or screen print.

When dispensing either directly from the syringe or through a positive displacement valve, system pressure should be moderate (15 to 40 psi). The typical cycle time required to dispense through a 0.4 mm diameter tip ranges from 30 to 100 milliseconds. Continuous extrusion of 1/2 mm diameter beads can be achieved at linear dispense rates of 1/4 to 2 inch/sec (depending on the application).

Stencil or screen printing; down to 0.5 mm pitch and 0.25 mm site width can be achieved at speeds up to 1 in/sec (depending on the application). For assistance with your application, please contact your local Technical Service Center.

NOT FOR PRODUCT SPECIFICATIONS.

THE TECHNICAL DATA CONTAINED HEREIN ARE INTENDED AS REFERENCE ONLY.

PLEASE CONTACT LOCTITE CORPORATION QUALITY DEPARTMENT FOR ASSISTANCE AND RECOMMENDATIONS ON SPECIFICATIONS FOR THIS PRODUCT.

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Re-work

Previously bonded assemblies can be separated by localized heating of the bond joint above the Tg of the material, along with moderate force (twisting, pulling) to remove the device.

Clean-up

Uncured adhesive can be cleaned with Loctite 7360. Removal of cured residue is best performed with micro-abrasion.

Storage

Product shall be ideally stored in a refrigerated, dry location in unopened containers at a temperature between -20° to 0°C (4° to 32°F) and preferably at the lower end of the range, unless otherwise labelled. Refrigerated packages shall be allowed to return to room temperature prior to use. To prevent contamination of unused product, do not return any material to its original container. For further specific shelf life information, contact your local Technical Service Center.

Data Ranges

The data contained herein may be reported as a typical value and/or range. Values are based on actual test data and are verified on a periodic basis.

Note

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Loctite Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Loctite Corporation's products. Loctite Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Loctite Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.