Research, Development & Engineering
Tallaght Business Park,
Dublin, Ireland

Technical Data Sheet
Product 3880

Worldwide Version, October 1998

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

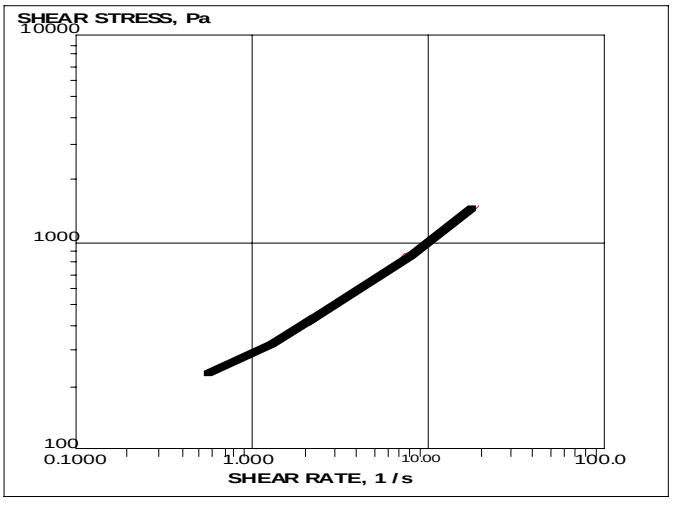
Bonding of metals, ceramics and plastics as used in electronic parts, where good adhesion combined with electrical and thermal conductivity is required. Typical examples are bonding of surface mount devices to flexible or rigid substrates; bonding of semiconductor elements; joining EMI parts; bonding 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	2.12
Viscosity @ 25°C, mPa.s (cP)	125,000
VOC (g/l)	177
Flash Point (TCC), °C	107

Flow Curve

The following graph shows a typical flow curve (ascending) as measured using a Haake rotoviscometer PK100, M10/PK1 2°Cone system at 23°C.



TYPICAL CURING PERFORMANCE

Cure times at temperature as determined by DSC:

@125ºC	10 min.
@150ºC	6 min.
@175ºC	3 min.

The above times give an indication of the time/temperature relation needed to cure the adhesive. Actual times needed will be longer since various part and board configurations heat at different rates depending on mass and types of ovens used. The adhesive itself needs to reach the indicated temperature for the indicated time to achieve full cure.

TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties	**Typical Value**
Coefficient of thermal expansion, ASTM D696, K^{-1}	
(-20 to 40ºC)	110 x 10^{-6}
(80 to 120ºC)	188 x 10^{-6}
Glass Transition Temperature, Tg, ºC	64
Coefficient of Thermal Conductivity, W/mºC	1.5
Modulus, MPa	1,275
(psi)	(185,000)
Tensile Strength @ peak, MPa	25
(psi)	(3,700)
Elongation @ peak, %	3.4
Weight Loss, 30 minute @ 200ºC, %	3.50
Chloride content, ppm	20
Sodium content, ppm	1
Potassium content, ppm	<1
Electrical Properties	
Volume Resistivity, Mil 883D, ohm-cm	< 0.0005

PERFORMANCE OF CURED MATERIAL

(cured for 15 minutes @ 130ºC)

Lap Shear Strength

Copper,	MPa	4.8
	(psi)	(690)
Epoxy (G-10),	MPa	3.4
	(psi)	(490)
Glass,	MPa	3.1
	(psi)	(450)
Aluminum,	MPa	2.8
	(psi)	(400)

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 reach room temperature before use. Product supplied in containers should be gently stirred before use. Clean parts are essential for proper adhesion. It is important to drive off all volatiles before applying adhesive. Fine pitch footprints down to 0.5mm (20 mil) are possible.

Recommendations for Screen Printing:

Thickness (wet) :	0.10 - 0.13mm (0.004“ - 0.005“)
Screen :	Polyester (40-60 mesh)
	Stainless Steel (60-80 mesh)
Emulsion Thickness:	0.05mm (0.002“) solvent resistant
Squeegee Hardness:	60 (for polyester)
	70 (for Stainless steel)

Recommendations for Syringe Dispensing:

For air pressure/time systems a good dot profile for SMD attachment can be achieved by using a 0.4mm ID nozzle with 3bar pressure at 25°C and times ranging from 30 to 100msec depending on chip size (0603 to 1206 format). For smaller components such as 0402, a smaller 0.3mm nozzle is recommended. Beads can be formed in a similar way.

For volumetric syringe systems special care is necessary and appropriate materials and valve design must be used. Supply pressure must be very low (1-3bar) to accurately control dispense quantity.

After dispensing, place the device on top of the wet adhesive and apply just enough pressure to allow the adhesive to wick onto the leads, but not to displace the adhesive onto adjacent conductive tracks. IR curing or optimised air flow will increase cure speed. Rework can be done by localised heating of the joint above its relatively low Tg.

Storage

Product shall be ideally stored in refrigerated, dry location in unopened containers at a temperature between -20°C to 0°C, (4°F 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 Centre.

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.