Technical Data Sheet

LOCTITE 3876

December 2016

PRODUCT DESCRIPTION

LOCTITE 3876 provides the following product characteristics:

Technology	Acrylate
Appearance - Part A	Pale yellow
Appearance - Part B	Pale blue
Components	Two-component
Product Benefits	• 175µm spacer beads for bondline thickness control • Thermally conductive • Ease of use
Cure	Room temperature
Application	Thermal management
Typical Assembly Applications	Transistors, Rectifiers, other power devices and computing applications such as memory chips, chipsets and graphic processor assembly

LOCTITE 3876 self-shimming, bead-on-bead, thermally conductive adhesive is designed to thermally couple and structurally bond heat sinks to heat dissipating electronic components. It is formulated to cure when the two components come into contact with one another, requiring no primer or heat .

LOCTITE 3876 contains glass spacer beads to create uniform bondline, providing consistent thermal properties and a known dielectric value to the interface.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Part A Properties

Viscosity, mPa·s (cP):	
@ Speed 2.5 rpm	65,000
@ Speed 20 rpm	32,000
Specific Gravity, g/cc	1.7
Flash Point - See SDS	

Part B Properties

Viscosity, mPa·s (cP):	
@ Speed 2.5 rpm	190,000
@ Speed 20 rpm	90,000
Specific Gravity, g/cc	1.7
Flash Point - See SDS	

TYPICAL CURING PERFORMANCE

Fixture Time

3 to 5 minutes @ 23°C

Cure Schedule

24 to 72 hours @ 23°C , 50% RH

The above cure profiles are guideline recommendations. Cure conditions (time and temperature) may vary based on customers' experience and their application requirements, as well as customer curing equipment, oven loading and actual oven temperatures.

TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties

Coefficient of Thermal Expansion , ppm/°C:	
Alpha 1	54
Alpha 2	141
Glass Transition Temperature (Tg), °C	28
Thermal Conductivity, ASTM D5470, W/(m-K)	1.76

TYPICAL PERFORMANCE OF CURED MATERIAL

Shear Strength

Tensile Shear Strength:		
Grit blasted steel	N/mm² (psi)	16 (2,400)
Aluminum	N/mm² (psi)	13 (1,900)

Die Shear Strength, kg-f:	
@ 25ºC:	
Ni/Cu leadframe	60
Ceramic	63
Silicon	68
Mold Compound	34
Contaminated Mold Compound	22
@ 125ºC:	
Ni/Cu leadframe	17
Ceramic	11
Silicon	8
Mold Compound	6
Contaminated Mold Compound	6

TYPICAL ENVIRONMENTAL RESISTANCE

The ability of LOCTITE 3876 to withstand exposure to a number of severe environments was determined by measuring the change in thermal resistance of a standard test piece.

In this these tests, a TO-247 MOSFET was bonded to the subject substrate. The baseline thermal resistance was determined after the material had fully cured.

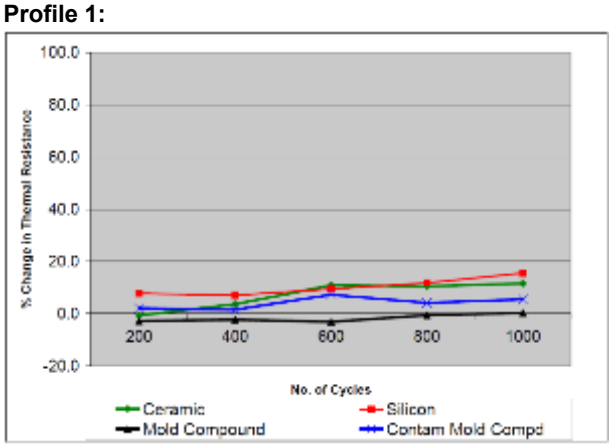
The numbers referenced below indicated the change in thermal resistance, measured at room temperature, after the test piece had been exposed to the referrenced condition for the alloted time.

Change in Thermal Resistance (% of Change)

Thermal Exposure , 1,000 hours:	
@ 25ºC:	
Ceramic	4.5
Silicon	-7.6
Mold Compound	-0.3
Contaminated Mold Compound	4.4
@ 125ºC:	
Ceramic	8.0
Silicon	-3.5
Mold Compound	-0.7
Contaminated Mold Compound	-4.1
Moisture Resistance , 1,000 hrs @ 85ºC/85% RH:	
Ceramic	6.5
Silicon	2.5
Mold Compound	-7.1
Contaminated Mold Compound	0.1
Thermal Shock , 15 cycles @ -50 to +150ºC (5 mins @ high temp + 5 mins @ low temp per cycle):	
Ceramic	2.8
Silicon	0.0
Mold Compound	5.5
Contaminated Mold Compound	3.1

Thermal Cycling , -25 to +125ºC temperature cycle, ramp 10ºC per minute, 10 minute dwell

Profile 1:



GENERAL INFORMATION

For safe handling information on this product, consult the Safety Data Sheet, (SDS).

THAWING:

1. LOCTITE 3876 is packed to maintain temperatures between 5 to 10ºC during transit.
2. DO NOT open the package before contents reach ambient temperature.
3. A new package of material can be brought to ambient conditions by allowing container to stand at room temperature for 2 hours. Actual time required will vary with package size/volume.
4. DO NOT attempt to thaw by applying additional heat.
5. Do not loosen container lids, caps or covers. Allow syringe packs to equilibrate in tip down orientation..

DIRECTIONS FOR USE

1. This two-part adhesive is designed to cure once the two components come into contact with each other. The material fixtures quickly and cures fully in 24-72 hours.
2. For best performance bond surfaces should be clean and free from grease.
3. Apply Part A to the component.
4. Apply Part B to the heat sink.
5. Apply enough material to each side so that there is enough material to cover at least 80% of the surface between the component and the heat sink and the material leaves a small fillet .
6. Best thermal performance is obtained by using a ratio as close to 50:50 as possible .
7. Place the heat sink on top of the component insuring that the beads of material overlap.
8. Secure the assembly and wait for the adhesive to fixture (approx 5 minutes) before further handling.

STORAGE:

Store in original, tightly covered containers in clean, dry areas. Storage information may be indicated on the product container labeling.

Optimal Storage: 5 to 10°C. Storage below 5°C or above 10°C can adversely affect product properties.

Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

Conversions

(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
N x 0.225 = lb
N/mm x 5.71 = lb/in
psi x 145 = N/mm²
MPa = N/mm²
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·s = cP

Disclaimer

Note:
The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.
Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

In case products are delivered by Henkel Belgium NV, Henkel Electronic Materials NV, Henkel Nederland BV, Henkel Technologies France SAS and Henkel France SA please additionally note the following:
In case Henkel would be nevertheless held liable, on whatever legal ground, Henkel's liability will in no event exceed the amount of the concerned delivery.

In case products are delivered by Henkel Colombiana, S.A.S. the following disclaimer is applicable:
The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.
Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

In case products are delivered by Henkel Corporation, Resin Technology Group, Inc., or Henkel Canada Corporation, the following disclaimer is applicable:
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, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel 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 Henkel 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.

Reference 1