

BERGQUIST LIQUI FORM TLF LF2000

BERGQUIST LIQUI-FORM 2000

January 2019

PRODUCT DESCRIPTION

Thermally Conductive, One-Part, Liquid Formable Material.

Technology	Silicone
Appearance	Gray
Cure	Pre-cure gel
Application	Thermal management, TIM (Thermal Interface Material)
Operating Temperature Range	-60 to 200°C
UL Flammability Rating	UL 94 V-0

FEATURES AND BENEFITS

- Thermal Conductivity: 2.0 W/m-K
- Applies very low force on components during assembly
- Low volumetric expansion
- Excellent chemical and mechanical stability even at higher temperatures
- No curing required
- Stable viscosity in storage and in the application

BERGQUIST LIQUI FORM TLF LF2000 is a high thermal conductivity liquid formable material designed for demanding applications requiring a balance between dispensability, low component stresses during assembly and ease of rework.

BERGQUIST LIQUI FORM TLF LF2000 is a highly conformable shear-thinning material which requires no curing, mixing or refrigeration. Its unique formulation assures excellent thermal performance, low applied stress and reliable long-term performance.

BERGQUIST LIQUI FORM TLF LF2000 is thixotropic and has a natural tack ensuring it forms around the component and stays in place in the application.

TYPICAL APPLICATIONS

- Bare die to heat spreader lid
- Filling various gaps between heat-generating devices to heat sink and housing
- Devices requiring low assembly pressure
- BGA, PGA, PPGA

TYPICAL PROPERTIES OF UNCURED MATERIAL

Viscosity, Capillary, ASTM D2196, Pa·s:	
High shear, Shear Rate 300 s ⁻¹	110
Viscosity, Parallel Plate, ASTM D4473, mPa·s (cP):	
Low shear, Shear Rate 0.001 s ⁻¹	20,000
Density, ASTM D792, g/cc	2.8
Shelf Life @ 25°C, months	6

TYPICAL PROPERTIES OF CURED MATERIAL**Physical Properties**

Volumetric Expansion, 25 to 275°C, ASTM E228 modified, ppm/°C	600
---	-----

Electrical Properties

Dielectric Strength, ASTM D149, V/mm	10,000
Dielectric Constant, ASTM D150, 1,000Hz	8.0
Volume Resistivity, ASTM D257, ohm-meter	1×10 ⁹

Outgassing Properties

Total Mass Loss, %, ASTM E595	0.53
-------------------------------	------

Thermal Properties

Thermal Conductivity, ASTM D5470, W/(m-K)	2.0
---	-----

Thermal Performance vs. Pressure

Thermal Impedance, ASTM D5470, °C-in ² /W ⁽¹⁾	
@ 10 psi	0.13
@ 25 psi	0.12
@ 50 psi	0.12

(1) The ASTM D5470 test fixture was utilized. The recorded values include the interfacial thermal resistance. The values are provided for reference only. Actual application performance is directly related to the surface roughness, flatness and pressure applied

GENERAL INFORMATION

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

Not for product specifications

The technical data contained herein are intended as reference only. Please contact your local quality department for assistance and recommendations on specifications for this product.

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.

CONFIGURATIONS AVAILABLE

BERGQUIST LIQUI FORM TLF LF2000 is supplied in:

Cartridges	30cc, 600cc
Pail	5gallon

THAWING:

1. If refrigerated, allow container to reach room temperature before use.
2. DO NOT open the container before contents reach 25°C temperature. Any moisture that collects on the thawed container should be removed prior to opening the container.

STORAGE

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

Optimal Storage: 5 to 25°C for a 6 month shelf life, in sealed containers with moisture barrier packaging.

Conversions

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$
 $\text{kV/mm} \times 25.4 = \text{V/mil}$
 $\text{mm} / 25.4 = \text{inches}$
 $\text{N} \times 0.225 = \text{lb/F}$
 $\text{N/mm} \times 5.71 = \text{lb/in}$
 $\text{psi} \times 145 = \text{N/mm}^2$
 $\text{MPa} = \text{N/mm}^2$
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$
 $\text{mPa}\cdot\text{s} = \text{cP}$

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.

Trademark usage

Except as otherwise noted, all trademarks in this document are trademarks of Henkel Corporation in the U.S. and elsewhere. ® denotes a trademark registered in the U.S. Patent and Trademark Office.

Reference 2