Technical Data Sheet

LOCTITE® ECCOBOND UF 3810

January 2025

PRODUCT DESCRIPTION

LOCTITE® ECCOBOND UF 3810 provides the following product characteristics:

Technology	Epoxy
Appearance	Black liquid
Product benefits	• One component • Fast cure at moderate temperatures • High Tg • Halogen free • Compatible with most Pb-free solders • Stable electrical performance in temperature humidity bias • Reworkable • Room temperature flow capability
Cure	Heat cure
Application	Underfill
Typical package application	Chip scale packages and BGA

LOCTITE® ECCOBOND UF 3810 reworkable epoxy underfill is designed for CSP and BGA applications. It cures quickly at moderate temperatures to minimize stress to other components. When cured, this material provides excellent mechanical properties to protect solder joints during thermal cycling.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Viscosity, Cone & Plate, @ 25 °C , mPa·s (cP):	
@ 20 s^{-1}	394
Specific gravity	1.13
Work life @ 25ºC, (25% increase in viscosity), days	3
Shelf life @ -20°C, (from date of manufacture), days	365
Flash point - see SDS	

TYPICAL CURING PERFORMANCE

Cure schedule

≥8 minutes @ 130°C

The above cure profiles are guideline recommendations. These conditions (time and temperature) may vary based on customers' experience and specific 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, TMA, ppm/°C:		
Below Tg		55
Above Tg		171
Glass transition temperature (Tg) by TMA, °C		102
Storage modulus, DMA		
@-65ºC	N/mm^2 (psi)	3,820 (475,723)
@25ºC	N/mm^2 (psi)	2,990 (435,000)
@100ºC	N/mm^2 (psi)	850 (123,282)
@200ºC	N/mm^2 (psi)	30 (4,351)
Thermal conductivity, Laser flash, W/(m-K)		0.29

Extractable ionic content, DI water, 1 hour @ 85 °C:	
Sodium (Na+)	0.7
Chloride (Cl-)	0.8
Magnesium (Mg2+)	N.D.
Calcium (Ca^{2+})	5
Potassium (K+)	N.D.
Ammonium (NH4+)	0.7
Nitrate (NO3)	N.D.
Phosphite (PO3)	N.D.
Sulfate (SO42-)	N.D.
Bromide (Br-)	N.D.

Electrical properties

Dielectric constant / Dissipation factor @ 23ºC	
@ 1 GHz	3.44 / 0.0071
@ 2 GHz	2.87 / 0.0037

TYPICAL PERFORMANCE OF CURED MATERIAL

Lap shear strengthISO 4587:

Glass epoxy to glass epoxy	N/mm^2 (psi)	9.7 (1,400)

GENERAL INFORMATION

Please consult the Safety Data Sheet (SDS) for safe handling information of this product.

Thawing

1. Thaw 30 cc syringes at least 1 hour at room temperature prior to use.
2. Allow container to reach room temperature before use.
3. After removing from the freezer, set the syringes to stand vertically while thawing.
4. DO NOT open the container before contents reach 25°C°C temperature. Any moisture that collects on the thawed container should be removed prior to opening the container.
5. DO NOT re-freeze. Once thawed to 25°C°C, the adhesive should not be re-frozen.

DIRECTIONS FOR USE

1. Thawed material should immediately be placed on dispense equipment for use.
2. If the adhesive is transferred to a final dispensing reservoir, care must be exercised to avoid entrapment of contaminants and/or air into the adhesive.
3. Adhesive must be completely used within the product's recommended work life.

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 the specifications of this product.

Storage

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

Optimal storage: -25 to -15°C. Storage above -15°C can adversely affect product properties.

Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel 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 Henkel representative.

Conversions

(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
µm / 25.4 = mil
N x 0.225 = lb
N/mm x 5.71 = lb/in
N/mm² x 145 = psi
MPa x 145 = psi
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

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, 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