



LOCTITE® ECCOBOND E 1216M

January 2025

PRODUCT DESCRIPTION

LOCTITE® ECCOBOND E 1216M provides the following product characteristics:

Technology	Epoxy
Appearance	Black
Cure	Heat cure
Product benefits	<ul style="list-style-type: none">• Snap curable• Fast, void-free underfill of area array devices• Excellent stability during shipping, storage and use• Excellent adhesion and strength• Non-anhydride curing chemistry• Passes NASA outgassing
Application	Underfill
Typical package application	CSP, BGA and Flip Chip BGA

LOCTITE® ECCOBOND E 1216M innovative capillary flow underfill is designed for high volume assembly operations requiring a very fast flowing underfill that fully cures in a single reflow cycle, but is stable enough to be easily shipped and used in large volume cartridges (up to 20 oz).

It is specifically formulated to eliminate anhydride-type curing agents for those users who prefer to work with anhydride-free products.

LOCTITE® ECCOBOND E 1216M passes NASA outgassing standards.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Viscosity, Brookfield, mPa·s (cP):	
Spindle 4, speed 20 rpm,	4,000
Flow rate, @ 80°C, seconds	
@ 1cm travel, 200µm gap	9
Specific gravity	1.4
Work life @ 25°C, (50% increase in viscosity), days	5
Shelf life @ -20°C, days	365

TYPICAL CURING PERFORMANCE

Cure schedule

Snap or inline cure, @165°C, minutes	3
Fast cure, @150°C, minutes	4
Low temperature cure, @130°C, minutes	10

The above cure profile(s) are guideline recommendations. These cure 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

Hardness, Shore D, @ 25°C:	
Sample cured 5 minutes @ 160°C	86
Coefficient of thermal expansion, ppm/°C::	
Below Tg	35
Above Tg	131
Glass transition temperature (Tg) by TMA, °C	125
Thermal conductivity, laser flash, W/(m·K)	0.42
Flexural modulus, 3-point bend test:	
@ -65°C	N/mm ² 7,380 (psi) (1.07×10 ⁶)
@ 25°C	N/mm ² 6,010 (psi) (872,000)
@ 100°C	N/mm ² 3,830 (psi) (555,000)
@ 150°C	N/mm ² 192 (psi) (27,800)
@ 200°C	N/mm ² 126 (psi) (18,300)
@ 250°C	N/mm ² 106 (psi) (15,400)



Electrical properties

Dielectric constant / Dissipation factor @ 23 °C

@ 5GHz	3.19/0.018
@ 10GHz	3.21/0.021
@ 20GHz	3.16/0.021
@ 30GHz	3.14/0.020
@ 40GHz	3.14/0.020
@ 50GHz	3.14/0.027
Volume resistivity, ohm-cm	$2.82 \times 10^{+16}$
Surface resistivity, ohm	$1.09 \times 10^{+14}$
Dielectric strength, kV/mm	42

GENERAL INFORMATION

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

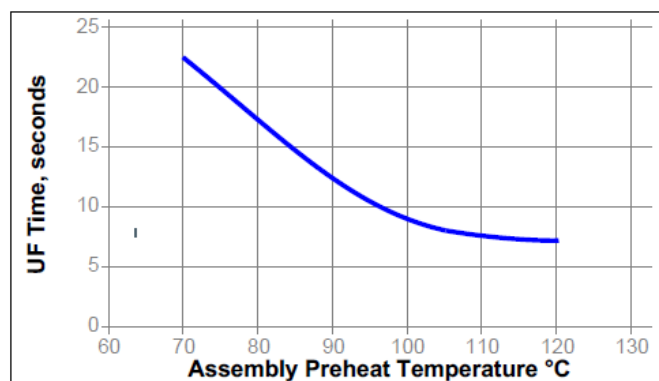
Thawing

1. Allow container to reach room temperature before use.
2. After removing from the freezer, set the syringes to stand vertically while thawing.
3. Thaw for 4 hours (6, 12, or 20oz cartridges) prior to use.

Directions for use

1. While it is not essential, the underfill area should be cleaned of contaminants and obstructions to optimize the speed and quality of the underfill.
2. Preheat assembly to between 70°C and 100°C. Higher temperatures reduce underfill times. Preheat assembly to 100°C for best results.
3. Use the graph below to determine the estimated underfilling time for your desired assembly preheat temperature.
4. Dispense a bead of the underfill using a syringe fitted with a 21 gauge needle (or larger) on one (line) or two sides (L-Shape) of the device perimeter.
5. Syringe tip heating is not needed, but can be used.
6. Very large devices may require multiple beads of underfill, but for most no second or 'fillet pass' is required.
7. Because of its low viscosity and outstanding wetting characteristics, LOCTITE® ECCOBOND E 1216M is designed to 'self-fillet' the opposite sides of the device.

Underfill time vs preheat temp:



Note: Use for estimate only. Data generated on Glass to Glass slide assembly with 180 micron gap, time is to flow a distance of 1 cm.

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.

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.

Conversions

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

Disclaimer

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