

LOCTITE[®] AA 3951[™]

December 2020

PRODUCT DESCRIPTION

LOCTITE[®] AA 3951[™] provides the following product characteristics:

Technology	Acrylic
Chemical Type	Acrylated urethane
Appearance (uncured)	Transparent, colorless to straw colored liquid ^{LMS}
Fluorescence	Positive under UV light ^{LMS}
Cure	Ultraviolet (UV) / Visible light
Cure Benefit	Production - high speed curing
Application	Flexible
Specific Benefits	<ul style="list-style-type: none"> • High elongation strength • High adhesion • High humidity resistance • Fast LED Curing

LOCTITE[®] AA 3951[™] is a low viscosity light cure adhesive designed for applications where a fast curing, highly flexible adhesive is required. It is an optimal choice when bonding plasticized PVC, TPEs, and thermoset rubbers. It also maintains high adhesion to rigid substrates such as polycarbonate, ABS, Acrylic, HDPE (when treated), PP (when treated) and more. Suitable for use in the assembly of **disposable medical devices**.

ISO-10993

LOCTITE[®] AA 3951[™] has been tested to Henkel's test protocols based on ISO 10993 biocompatibility standards, as a means to assist in the selection of products for use in the medical device industry.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	~1.05
Viscosity, Cone & Plate, 25 °C, mPa·s (cP): @ 200 s ⁻¹	70 to 300 ^{LMS}

Flash Point - See SDS

TYPICAL CURING PERFORMANCE

Stress Cracking

Liquid adhesive is applied to a medical grade polycarbonate bar 2.54 cm by 10.16 mm by 3.175 mm which is then flexed to induce a known stress level. The time until stress cracking is observed.

Stress Cracking, ASTM D 3929, minutes:

6.9 N/mm ² stress on bar	<60
13.8 N/mm ² stress on bar	≤5
20.7 N/mm ² stress on bar	≤1

Fixture Time

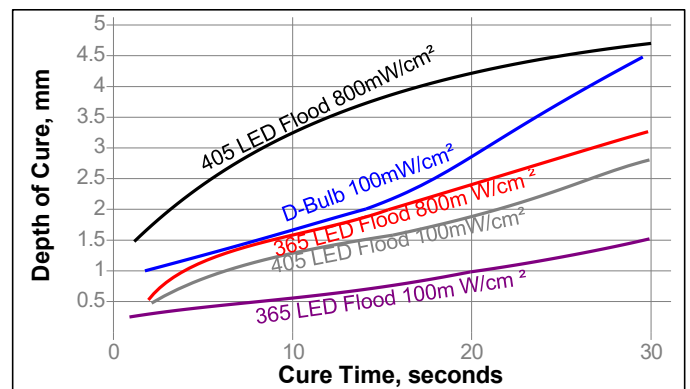
Fixture time is defined as the time to develop a shear strength of 0.1 N/mm².

UV Fixture Time, Glass microscope slides, seconds:

10 mW/cm ² , measured @ 405 nm	≤5 ^{LMS}
---	-------------------

Depth of Cure

The graph below shows the increase in depth of cure with time at various light intensities as measured from the thickness of the cured product formed



TYPICAL PROPERTIES OF CURED MATERIAL

Cured @ 1 W/cm², measured @ 405 nm for 10 seconds.

Physical Properties:

Linear Shrinkage, ASTM D 792, %	3.2
Specific Gravity @ 25 °C	~1.15
Shore Hardness, ISO 868, Durometer D	62
Elongation, at break, ISO 527-3, %	251
Tensile Modulus	N/mm ² 490 (psi) (71,000)
Tensile Strength, ISO 527-3	N/mm ² 22.92 (psi) (3,324)

Water Absorption, ISO 62, %:

2 hours in water @ 100 °C	8.5%
Re-Dry Weight, Soluble Matter Lost	2.5%

Glass Transition Temperature, ISO 11359-2, °C	20
Coefficient of Thermal Expansion, ISO 11359-2, K-1:	
Pre Tg	76×10 ⁻⁶
Post Tg	500×10 ⁻⁶
Refractive Index	1.5

Electrical Properties:

Dielectric strength, ASTM D149-97a, kV/mm	~28.5
---	-------

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured @ 1 W/cm², measured @ 405 nm for 10 seconds.

Block Shear Strength, ISO 13445:

Acrylic	N/mm ² 5.5 (psi) (801)
Polycarbonate to PVC	N/mm ² 7.7 (psi) (1,115)
Polypropylene (plasma treated)	N/mm ² 1.1 (psi) (160)
LDPE (plasma treated)	N/mm ² 3.1 (psi) (459)
HDPE (plasma treated)	N/mm ² 4.4 (psi) (645)
PC (grit blasted) to PC	N/mm ² 22.5 (psi) (3,268)

Lap Shear Strength, ISO 4587:

PC to Plasticized PVC	N/mm ² 2 (psi) (292)
PC to Plasticized PVC (Heat Aged 12 days)	N/mm ² 1.9 (psi) (269)
PC to TPU	* N/mm ² 2.9 * (psi) (415)
PC to Stainless Steel	N/mm ² 3.3 (psi) (476)
PC to Steel	N/mm ² 4.4 (psi) (631)
PC to Aluminum	N/mm ² 2.9 (psi) (425)
Glass	* N/mm ² 4.4 * (psi) (631)

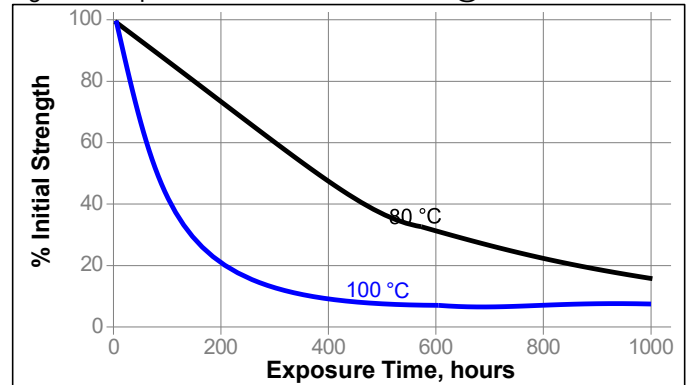
*substrate failure

TYPICAL ENVIRONMENTAL RESISTANCE

Cured @ 1 W/cm², measured @ 405 nm for 10 seconds PC to PC Block Shear Strength, ISO13445:

Heat Aging

Aged at temperature indicated and tested @ 22 °C



Chemical/Solvent Resistance

Cured @ 1 W/cm², measured @ 405 nm for 10 seconds PC to PVC Block Shear Strength, ISO13445:

Environment	°C	% of initial strength			
		2 h	24 h	168 h	480 h
Water	100	173	-----	-----	-----
Air	60	-----	-----	-----	169
Isopropanol	22	-----	87	-----	-----
Heat/humidity 98% RH	40	-----	-----	75	-----

Sterilization Resistance

Cured @ 1 W/cm², measured @ 405 nm for 10 seconds PC to PC Block Shear Strength, ISO13445:

Treatment Time	% of Initial Strength
Ethylene Oxide, 1 cycle	88
Ethylene Oxide, 2 cycle	74
GAMMA, >50 Kilo gray	89
Autoclave, 1 cycle	69
Autoclave, 5 cycles	39

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 Safety Data Sheet (SDS).

Directions For Use:

1. This product is light sensitive; exposure to daylight, UV light and artificial lighting should be kept to a minimum during storage and handling.
2. The product should be dispensed from applicators with black feedlines.
3. For best performance bond surfaces should be clean and free from grease.
4. Cure rate is dependent on lamp intensity, distance from light source, depth of cure needed or bondline gap and light transmittance of the substrate through which the radiation must pass.
5. Cooling should be provided for temperature sensitive substrates such as thermoplastics.
6. Plastic grades should be checked for risk of stress cracking when exposed to liquid adhesive.
7. Excess uncured adhesive can be wiped away with organic solvent (e.g. Acetone).
8. Bonds should be allowed to cool before subjecting to any service loads.

Loctite Material Specification^{LMS}

LMS dated June 5, 2017. Test reports for each batch are available for the indicated properties. LMS test reports include selected QC test parameters considered appropriate to specifications for customer use. Additionally, comprehensive controls are in place to assure product quality and consistency. Special customer specification requirements may be coordinated through Henkel Quality.

Storage

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

Optimal Storage: 8 °C to 21 °C. Storage below 8 °C or greater than 28 °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 Henkel Representative.

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 0.4