

# LOCTITE<sup>®</sup> AA 3971<sup>™</sup>

Known as LOCTITE<sup>®</sup> 3971<sup>™</sup>  
December 2013

## PRODUCT DESCRIPTION

LOCTITE<sup>®</sup> AA 3971<sup>™</sup> provides the following product characteristics:

<b>Technology</b>	Acrylic
<b>Chemical Type</b>	UV acrylic
<b>Appearance (uncured)</b>	Transparent liquid <sup>LMS</sup>
<b>Fluorescence</b>	Positive under UV light <sup>LMS</sup>
<b>Components</b>	One component - requires no mixing
<b>Viscosity</b>	Low
<b>Cure</b>	Ultraviolet (UV)/ visible light
<b>Cure Benefit</b>	Production - high speed curing
<b>Application</b>	Bonding

LOCTITE<sup>®</sup> AA 3971<sup>™</sup> is suitable for a wide variety of applications that require fast cure and high adhesion to plasticized materials. LOCTITE<sup>®</sup> AA 3971<sup>™</sup> cures in seconds when exposed to light of the proper wavelength and intensity. The ability of this product to fluoresce under black light facilitates inspection of bonded assemblies for adhesive presence. LOCTITE<sup>®</sup> AA 3971<sup>™</sup> was specifically designed for bonding stainless steel cannulae into hubs, syringes and lancets for needle assemblies. Suitable for use in the assembly of **disposable medical devices**. The viscosity of this product makes the adhesive well suited for applications where the adhesive will be dispensed in the well after the cannulae and the hub have been assembled.

## ISO-10993

An ISO 10993 Test Protocol is an integral part of the Quality Program for LOCTITE<sup>®</sup> AA 3971<sup>™</sup>. LOCTITE<sup>®</sup> AA 3971<sup>™</sup> has been qualified to Henkel's ISO 10993 Protocol as a means to assist in the selection of products for use in the medical device industry. Certificates of Compliance are available on Henkel's website or through the Henkel Quality Department.

## TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C 1.05

Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP):  
Spindle 2, speed 20 rpm 200 to 425<sup>LMS</sup>

Flash Point - See SDS

## TYPICAL CURING PERFORMANCE

### Fixture Time

Fixture time is defined as the time to develop a shear strength of 0.1 N/mm<sup>2</sup>.

UV Fixture Time, Glass microscope slides, seconds:

Black light: 6 mW/cm <sup>2</sup> , measured @ 365 nm	≤7 <sup>LMS</sup>
Zeta <sup>®</sup> 7410 light source: 30 mW/cm <sup>2</sup> , measured @ 365 nm	<5
Electrodeless, D bulb: 100 mW/cm <sup>2</sup> , measured @ 365 nm	<5

### Tack Free Time

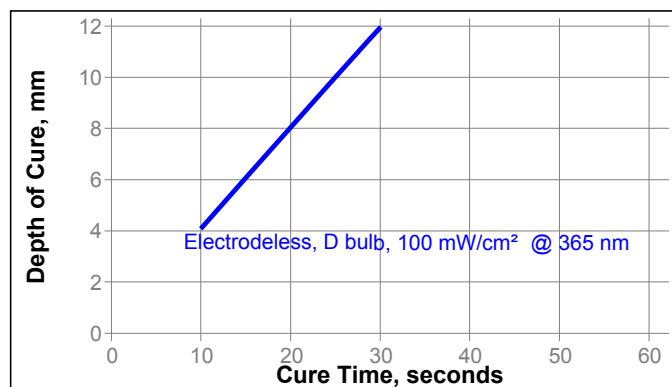
Tack Free Time is the time required to achieve a tack free surface

Tack Free Time, seconds:

Zeta <sup>®</sup> 7410: 30 mW/cm <sup>2</sup> , measured @ 365 nm,	5 to 10
Electrodeless, D bulb: 100 mW/cm <sup>2</sup> , measured @ 365 nm	<5

### Depth of Cure

The graph below shows the increase in depth of cure with time at 100mW/cm<sup>2</sup> as measured from the thickness of the cured product formed in an aluminum weighing dish.



**TYPICAL PROPERTIES OF CURED MATERIAL**Cured @ 50 mW/cm<sup>2</sup>, measured @ 365 nm, for 15 seconds**Physical Properties:**Depth of Cure, mm  $\geq 1.5^{LMS}$ Cured @ 100 mW/cm<sup>2</sup>, measured @ 365 nm, for 30 seconds per side using an Electroless system, D bulb**Physical Properties:**Coefficient of Thermal Expansion,  
ISO 11359-2, K<sup>-1</sup>:

Pre Tg 121

Post Tg 202

Glass Transition Temperature ISO 11359-2, °C 52

Water Absorption, ISO 62, %:

2 hours in water @ 100 °C 9.8

7 days in water @ 22 °C 13.3

Linear Shrinkage, ASTM D 792, % 2.0

Shore Hardness, ISO 868, Durometer D 66

Elongation, at break, ISO 527-3, % 93

Tensile Strength, ISO 527-3  
N/mm<sup>2</sup> 26  
(psi) (3,700)  
N/mm<sup>2</sup> 655  
(psi) (95,000)

Tensile Modulus, ISO 527-3

**TYPICAL PERFORMANCE OF CURED MATERIAL****Adhesive Properties**Cured @ 1,000 mW/cm<sup>2</sup>, measured @ 365 nm, for 10 seconds using an Electroless system, D bulb**Needle Pullout Strength:**

Material	22 Gauge Cannula	27 Gauge Cannula:
ABS	N 182 (lb) (41)	N 93 (lb) (21)
Acrylic	N 192 (lb) (44)	N 102 (lb) (29)
Polycarbonate	N 178 (lb) (40)	N 80 (lb) (18)
Polyethylene	N 13 (lb) (3)	N 13 (lb) (3)
Polyethylene (plasma treated)	N 125 (lb) (28)	N 111 (lb) (25)
Polypropylene	N 22 (lb) (5)	N 9 (lb) (2)
Polypropylene (plasma treated)	N 31 (lb) (7)	N 22 (lb) (5)
Polystyrene	N 205 (lb) (46)	N 120 (lb) (27)
Polyurethane	N 182 (lb) (41)	N 111 (lb) (25)

Cured @ 100 mW/cm<sup>2</sup>, measured @ 365 nm, for 30 seconds**Block Shear Strength, ISO 13445:**

Acrylic to Glass	N/mm <sup>2</sup> 3.0 (psi) (440)
Acrylic to Acrylic	N/mm <sup>2</sup> 12 (psi) (1,700)
G-10 Epoxyglass to Glass	N/mm <sup>2</sup> 7.0 (psi) (1,000)
Nylon to Glass	N/mm <sup>2</sup> 2.5 (psi) (360)
Polybutylene Terephthalate to Glass	N/mm <sup>2</sup> 4.4 (psi) (640)
Polycarbonate to Polycarbonate	N/mm <sup>2</sup> 22 (psi) (3,200)
Polyvinylchloride to Glass	N/mm <sup>2</sup> 5.5 (psi) (800)
Aluminum (grit blasted) to Glass	N/mm <sup>2</sup> 17 (psi) (2,500)
Steel (grit blasted) to Glass	N/mm <sup>2</sup> 13 (psi) (1,900)

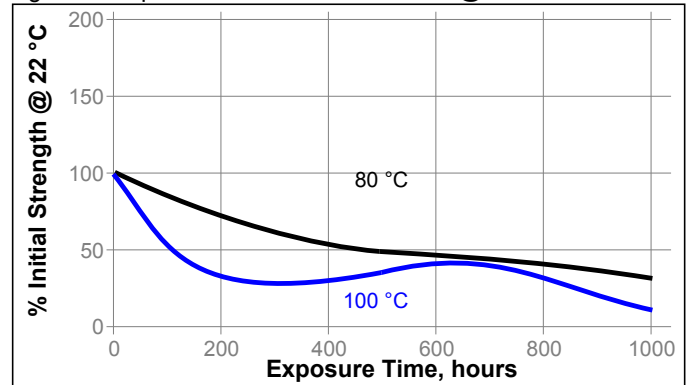
**TYPICAL ENVIRONMENTAL RESISTANCE**Cured @ 100 mW/cm<sup>2</sup>, measured @ 365 nm, for 30 seconds

Block Shear Strength, ISO 13445:

Polycarbonate to Polycarbonate

**Heat Aging**

Aged at temperature indicated and tested @ 22 °C

**Chemical/Solvent Resistance**

Aged under conditions indicated and tested @ 22 °C.

Environment	°C	% of initial strength			
		24 h	100 h	500 h	1000 h
95% RH	40	----	95	45	55
Water immersion	22	-----	100	65	85
Isopropanol	22	75	-----	-----	-----
Heptane	22	85	-----	-----	-----

**Thermal Stability of Needle Assemblies**

Aged @ 60 °C and tested @ 22 °C

Needle Pullout Strength, % of initial strength **4 weeks 8 weeks:**

Polycarbonate:				
22 Gauge Cannula		50	40	
27 Gauge Cannula		65	45	
Polypropylene (plasma treated):				
22 Gauge Cannula		85	40	
27 Gauge Cannula		60	60	
Polystyrene:				
22 Gauge Cannula		60	45	
27 Gauge Cannula		55	45	

**Sterilization Resistance of Needle Assemblies**

Sterilized as indicated and tested @ 22 °C

Needle Pullout Strength, % of initial strength:

	Gamma 30kGy	ETO 1 Cycle	Autoclave 1 Cycle   5 Cycles	
Polycarbonate:				
22 Gauge Cannula	95	45	30	5
27 Gauge Cannula	90	55	55	5
Polypropylene (plasma treated):				
22 Gauge Cannula	90	70	70	60
27 Gauge Cannula	100	80	120	80
Polystyrene:				
22 Gauge Cannula	100	55	----	----
27 Gauge Cannula	110	65	----	----

**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<sup>LMS</sup>**

LMS dated July 29, 2002. 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 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  
 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

**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.

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**Reference 2.4**