



# LOCTITE® 4306™

July 2005

## PRODUCT DESCRIPTION

LOCTITE® 4306™ provides the following product characteristics:

<b>Technology</b>	Cyanoacrylate/UV
<b>Chemical Type</b>	Ethyl cyanoacrylate with photoinitiator
<b>Appearance</b>	Transparent, light yellow-green to dark blue-green liquid <sup>LMS</sup>
<b>Fluorescence</b>	Positive under UV light <sup>LMS</sup>
<b>Components</b>	One part - requires no mixing
<b>Viscosity</b>	Low
<b>Cure</b>	Ultraviolet (UV)/ visible light
<b>Secondary Cure</b>	Humidity
<b>Application</b>	Bonding
<b>Key Substrates</b>	Plastics, Rubbers and Metals

LOCTITE® 4306™ is designed for bonding applications that require very rapid fixturing, fillet cure or surface cure. The UV light cure properties facilitate rapid curing of exposed surface areas thereby minimizing blooming and providing an alternative to solvent borne accelerators. Suitable for use in the assembly of **disposable medical devices**.

### ISO-10993

An ISO 10993 Test Protocol is an integral part of the Quality Program for LOCTITE® 4306™. LOCTITE® 4306™ has been qualified to Loctite'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 at [www.loctite.com](http://www.loctite.com) or through the Henkel Loctite Quality Department.

### TYPICAL PROPERTIES OF UNCURED MATERIAL

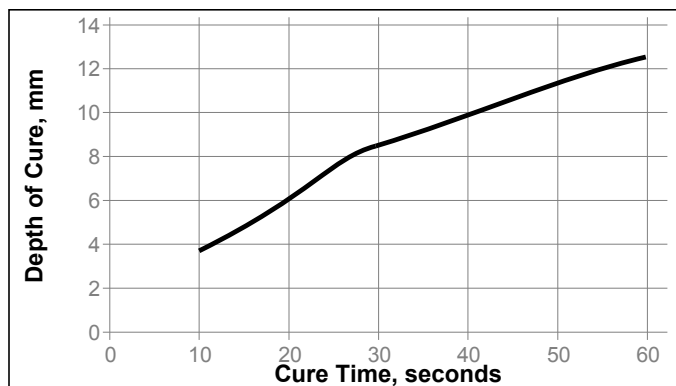
Specific Gravity @ 25 °C	1.05
Flash Point - See MSDS	
Viscosity, Cone & Plate, mPa·s (cP):	
Temperature: 25 °C, Shear Rate: 3,000 s <sup>-1</sup>	10 to 35 <sup>LMS</sup>

### TYPICAL CURING PERFORMANCE

#### Primary Cure Mechanism, UV

#### Depth of Cure:

Electrodeless, D bulb, 100 mW/cm<sup>2</sup> @ 365 nm



### Tack Free Time / Surface Cure

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

#### UV/Visible Light Sources:

Electrodeless, D bulb:

100 mW/cm<sup>2</sup> @ 365 nm ≤5

Zeta® 7400:

30 mW/cm<sup>2</sup> @ 365 nm ≤5

Electrodeless, H bulb:

30 mW/cm<sup>2</sup> @ 365 nm ≤10<sup>LMS</sup>

### Cure Speed vs. Substrate

The rate of cure will depend on the substrate used. The table below shows the fixture time achieved on different materials at 22 °C / 50 % relative humidity. This is defined as the time to develop a shear strength of 0.1 N/mm<sup>2</sup>. Fixture time measurements relate to non-UV cure.

#### Fixture Time, ISO 4587, seconds:

ABS	5 to 10
Acrylic	5 to 10
Aluminum (etched)	20 to 30
Neoprene	≤5
Phenolic	30 to 45
Polycarbonate	30 to 45
Polyethylene	>300
Polyethylene (Primer 770)	5 to 10
Polypropylene	>300
Polypropylene (Primer 770)	≤5
PVC	90 to 105
Steel (grit blasted)	≤5

### TYPICAL PROPERTIES OF CURED MATERIAL

Cured @ 100 mW/cm<sup>2</sup> @ 365 nm for 30 seconds per side using an Electrodeless system, D bulb

#### Physical Properties:

Coefficient of Thermal Expansion, ASTM D 696, K <sup>-1</sup> :	
Pre Tg	92×10 <sup>-6</sup>
Glass Transition Temperature, ASTM E 228, °C	116
Shore Hardness, ISO 868, Durometer D	82
Linear Shrinkage, ASTM D792, %	16
Water Absorption, ISO 62, %:	
2 hours in boiling water	2.0
7 days in water @ 22 °C	1.1
Elongation, at break, ISO 527, %	2.2
Tensile Strength, ISO 527	N/mm <sup>2</sup> 32.5
	(psi) (4,720)
Tensile Modulus, ISO 527	N/mm <sup>2</sup> 1,730
	(psi) (250,700)

**TYPICAL PERFORMANCE OF CURED MATERIAL****Adhesive Properties**

Cured @ 30 mW/cm<sup>2</sup> @ 365 nm for 10 seconds  
 Block Shear Strength, ISO 13445:  
 Polycarbonate N/mm<sup>2</sup> ≥9.0<sup>LMS</sup>  
 (psi) (≥1,305)

Cured @ 100 mW/cm<sup>2</sup> @ 365 nm for 10 seconds  
 Block Shear Strength, ISO 13445:

Acrylic to Glass	N/mm <sup>2</sup>	2.3
	(psi)	(320)
Acrylic to Acrylic	N/mm <sup>2</sup>	13.6
	(psi)	(1,970)
G-10 Epoxy to Glass	N/mm <sup>2</sup>	5.0
	(psi)	(725)
Nylon to Glass	N/mm <sup>2</sup>	1.1
	(psi)	(160)
Polybutylene Terephthalate to Glass	N/mm <sup>2</sup>	3.7
	(psi)	(540)
Polycarbonate to Polycarbonate	N/mm <sup>2</sup>	15.2
	(psi)	(2,200)
PVC to Glass	N/mm <sup>2</sup>	1.8
	(psi)	(260)
Aluminum (grit blasted) to Glass	N/mm <sup>2</sup>	10.9
	(psi)	(1,590)
Steel (grit blasted) Glass	N/mm <sup>2</sup>	10.1
	(psi)	(1,460)

Cured @ 1,000 mW/cm<sup>2</sup> for 10 seconds using an  
 Electrodeless system, D bulb

**Needle Pullout Strength:**

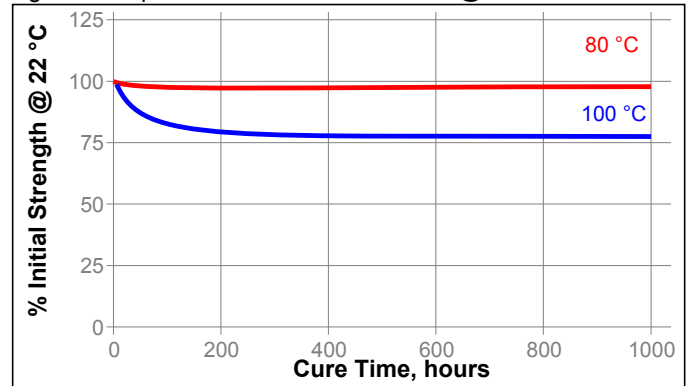
Material	22 Gauge Cannula	27 Gauge Cannula
ABS	N 138 (lb) (31)	N 31 (lb) (7)
Acrylic	N 191 (lb) (43)	N 13 (lb) (3)
Polycarbonate	N 245 (lb) (55)	N 89 (lb) (20)
Polyethylene	N 40 (lb) (9)	N 18 (lb) (4)
Polyethylene (plasma treated)	N 98 (lb) (22)	N 44 (lb) (10)
Polypropylene	N 18 (lb) (4)	N 9 (lb) (2)
Polypropylene (plasma treated)	N 53 (lb) (12)	N 22 (lb) (5)
Polystyrene	N 98 (lb) (22)	N 9 (lb) (2)
Polyurethane	N 98 (lb) (22)	N 49 (lb) (11)

**TYPICAL ENVIRONMENTAL RESISTANCE**

Cured @ 30 mW/cm<sup>2</sup> @ 365 nm for 10 seconds  
 Block Shear Strength, ISO 13445:  
 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
Water	22	-----	140	115	110
95% RH	40	-----	115	100	100
Heptane	22	105	-----	-----	-----
Isopropanol	22	110	-----	-----	-----

**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		100	100
27 Gauge Cannula		90	60
Polypropylene (plasma treated):			
22 Gauge Cannula		100	40
27 Gauge Cannula		80	80
Polystyrene:			
22 Gauge Cannula		60	70
27 Gauge Cannula		100	100

**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	55	75	45	25
27 Gauge Cannula	30	40	15	25
Polypropylene (plasma treated):				
22 Gauge Cannula	75	90	40	50
27 Gauge Cannula	80	100	40	80
Polystyrene:				
22 Gauge Cannula	65	55	N/A	N/A
27 Gauge Cannula	50	150	N/A	N/A

N/A = Not available. The polystyrene was not compatible with the autoclave sterilization process.

**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 Material Safety Data Sheet (MSDS).**

**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. For best performance bond surfaces should be clean and free from grease.
3. Excess adhesive can be dissolved with Loctite cleanup solvents, nitromethane or acetone.

**Loctite Material Specification<sup>LMS</sup>**

LMS dated March 03, 2003. 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: 2 °C to 8 °C. Storage below 2 °C or greater than 8 °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**

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

**Note**

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Reference 1.1