Technical Data Sheet

LOCTITE® 4306™

July 2013

PRODUCT DESCRIPTION

LOCTITE® 4306™ provides the following product characteristics:

Technology	Cyanoacrylate/UV
Chemical Type	Ethyl cyanoacrylate with photoinitiator
Appearance	Transparent, light yellow-green to dark blue-green liquid[LMS]
Fluorescence	Positive under UV light[LMS]
Components	One part - requires no mixing
Cure	Ultraviolet (UV)/ visible light
Secondary Cure	Humidity
Application	Bonding
Key Substrates	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 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

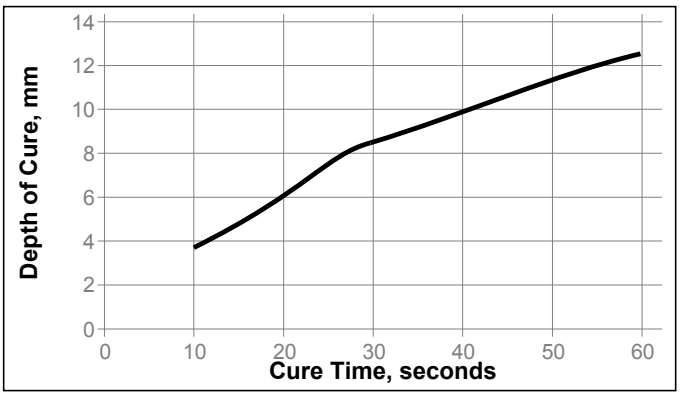
Flash Point - See MSDS

Viscosity, Cone & Plate, mPa·s (cP):
Temperature: 25 °C, Shear Rate: 3,000 s^{-1} 10 to 35[LMS]

TYPICAL CURING PERFORMANCE

Primary Cure Mechanism, UV

Depth of Cure:
Electrodeless, D bulb, 100 mW/cm² , measured @ 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/cm² , measured @ 365 nm ≤5

Zeta® 7400:
30 mW/cm² , measured @ 365 nm ≤5

Electrodeless, H bulb:
30 mW/cm² , measured @ 365 nm ≤10[LMS]

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/mm² . Fixture time measurements relate to non-UV cure.

Fixture Time, 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/cm² , measured @ 365 nm, for 30 seconds per side using an Electrodless system, D bulb

Physical Properties:

Coefficient of Thermal Expansion, ISO 11359-2, K^{-1}:		
Pre Tg		92×10^{-6}
Glass Transition Temperature, ASTM E 228, °C		116
Shore Hardness, ISO 868, Durometer D		82
Linear Shrinkage, ASTM D 792, %		16
Water Absorption, ISO 62, %:		
2 hours in boiling water		2.0
7 days in water @ 22 °C		1.1
Elongation, at break, ISO 527-3, %		2.2
Tensile Strength, ISO 527-3	N/mm²	32.5
	(psi)	(4,720)
Tensile Modulus, ISO 527-3	N/mm²	1,730
	(psi)	(250,700)

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured @ 30 mW/cm² , measured @ 365 nm, for 10 seconds

Block Shear Strength, ISO 13445:

Polycarbonate	N/mm²	≥9.0[LMS]
	(psi)	(≥1,305)

Cured @ 100 mW/cm² , measured @ 365 nm, for 10 seconds

Block Shear Strength, ISO 13445:

Acrylic to Glass	N/mm²	2.3
	(psi)	(320)
Acrylic to Acrylic	N/mm²	13.6
	(psi)	(1,970)
G-10 Epoxy to Glass	N/mm²	5.0
	(psi)	(725)
Nylon to Glass	N/mm²	1.1
	(psi)	(160)
Polybutylene Terephthalate to Glass	N/mm²	3.7
	(psi)	(540)
Polycarbonate to Polycarbonate	N/mm²	15.2
	(psi)	(2,200)
PVC to Glass	N/mm²	1.8
	(psi)	(260)
Aluminum (grit blasted) to Glass	N/mm²	10.9
	(psi)	(1,590)
Steel (grit blasted) Glass	N/mm²	10.1
	(psi)	(1,460)

Cured @ 1,000 mW/cm² , for 10 seconds using an Electrodeless system, D bulb

Needle Pullout Strength:

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

TYPICAL ENVIRONMENTAL RESISTANCE

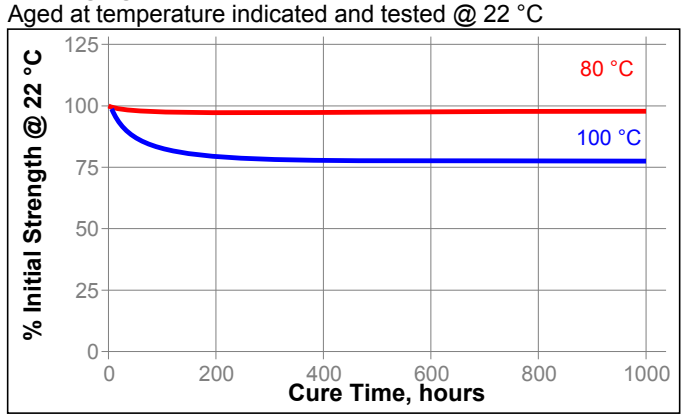
Cured @ 30 mW/cm² , measured @ 365 nm, for 10 seconds

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.

		% of initial strength			
Environment	**°C**	**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	ETO	Autoclave	
	30kGy	1 Cycle	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 compatabile 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[LMS]
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
(°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

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.
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, Resin Technology Group, Inc., 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 1.2