LOCTITE® 406™

February 2008

PRODUCT DESCRIPTION

LOCTITE® 406™ provides the following product characteristics:

Technology	Cyanoacrylate
Chemical Type	Ethyl cyanoacrylate
Appearance (uncured)	Transparent, colorless to straw colored liquid[LMS]
Components	One part - requires no mixing
Viscosity	Low
Cure	Humidity
Application	Bonding
Key Substrates	Plastics and Rubbers

LOCTITE® 406™ is designed for bonding of plastics and elastomeric materials where very fast fixturing is required.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.05
Viscosity, Cone & Plate, mPa·s (cP):	
Temperature: 25 °C, Shear Rate: 3,000 s^{-1}	12 to 22[LMS]
Viscosity, Brookfield - LVF, 25 °C, mPa·s (cP):	
Spindle 1, speed 30 rpm	15 to 25
Flash Point - See MSDS	

TYPICAL CURING PERFORMANCE

Under normal conditions, the atmospheric moisture initiates the curing process. Although full functional strength is developed in a relatively short time, curing continues for at least 24 hours before full chemical/solvent resistance is developed.

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 .

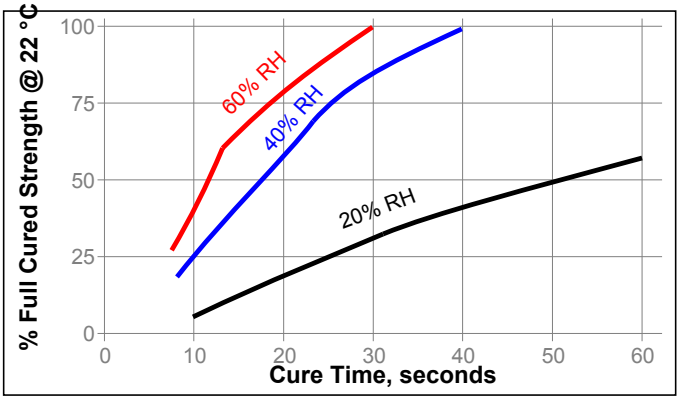
Fixture Time, seconds:	
Steel (degreased)	10 to 20
Aluminum (etched)	2 to 10
Zinc dichromate	30 to 90
Neoprene	<5
Rubber, nitrile	<5
ABS	2 to 10
PVC	2 to 10
Polycarbonate	15 to 50
Phenolic	5 to 15

Cure Speed vs. Bond Gap

The rate of cure will depend on the bondline gap. Thin bond lines result in high cure speeds, increasing the bond gap will decrease the rate of cure.

Cure Speed vs. Humidity

The rate of cure will depend on the ambient relative humidity. The following graph shows the tensile strength developed with time on Buna N rubber at different levels of humidity.



Cure Speed vs. Activator

Where cure speed is unacceptably long due to large gaps, applying activator to the surface will improve cure speed. However, this can reduce ultimate strength of the bond and therefore testing is recommended to confirm effect.

TYPICAL PROPERTIES OF CURED MATERIAL

After 24 hours @ 22 °C

Physical Properties:

Coefficient of Thermal Expansion, ISO 11359-2, K^{-1}	80×10^{-6}
Coefficient of Thermal Conductivity, ISO 8302, W/(m·K)	0.1
Glass Transition Temperature, ASTM E 228, °C	120

Electrical Properties:

Dielectric Constant / Dissipation Factor, IEC 60250:	
0.1 kHz	2.65 / <0.02
1 kHz	2.75 / <0.02
10 kHz	2.75 / <0.02
Volume Resistivity, IEC 60093, Ω·cm	10×10^{15}
Surface Resistivity, IEC 60093, Ω	10×10^{15}
Dielectric Breakdown Strength, IEC 60243-1, kV/mm	25

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

After 24 hours @ 22 °C

Lap Shear Strength, ISO 4587:

Steel (grit blasted)	N/mm²	18 to 26
	(psi)	(2,610 to 3,770)
Aluminum (etched)	N/mm²	11 to 19
	(psi)	(1,595 to 2,755)
Zinc dichromate	N/mm²	6 to 14
	(psi)	(870 to 2,030)
ABS	N/mm²	4 to 6
	(psi)	(580 to 870)
PVC	N/mm²	4 to 6
	(psi)	(580 to 870)
Polycarbonate	N/mm²	3.5 to 4.5
	(psi)	(510 to 650)
Phenolic	N/mm²	5 to 15
	(psi)	(725 to 2,175)
Neoprene	N/mm²	5 to 15
	(psi)	(725 to 2,175)

Nitrile	N/mm² (psi)	5 to 15 (725 to 2,175)
Tensile Strength, ISO 6922:		
Steel (grit blasted)	N/mm² (psi)	12 to 25 (1,740 to 3,625)
Buna-N	N/mm² (psi)	5 to 15 (725 to 2,175)
After 10 seconds @ 22 °C		
Tensile Strength, ISO 6922:		
Buna-N	N/mm² (psi)	6.9[LMS] (1,000)

TYPICAL ENVIRONMENTAL RESISTANCE

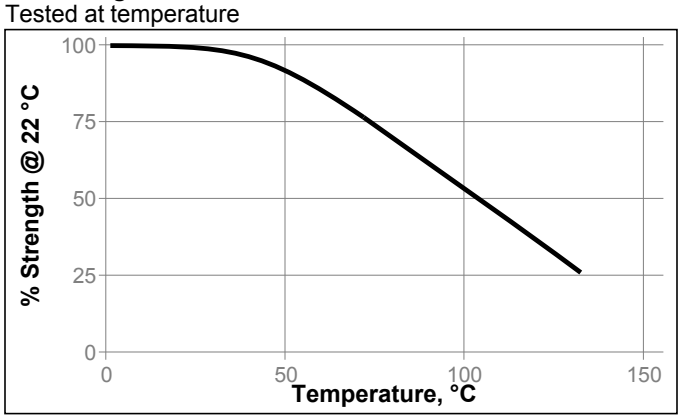
Cured for 1 week @ 22 °C

Lap Shear Strength, ISO 4587:

Mild Steel (grit blasted)

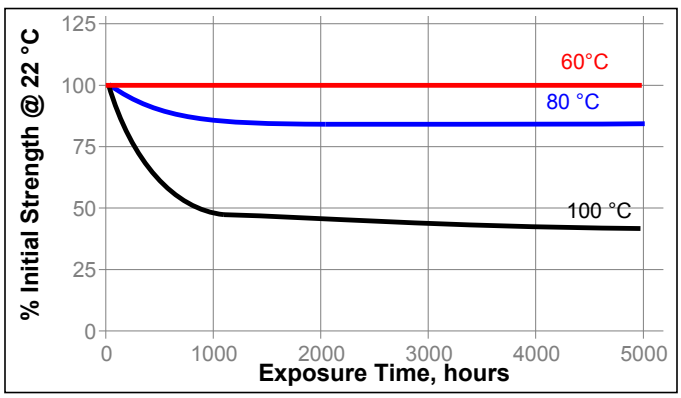
Hot Strength

Tested at temperature



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**	**100 h**	**500 h**	**1000 h**
Motor oil (MIL-L-46152)	40	100	100	95
Gasoline	22	100	100	100
Water/glycol 50/50	22	100	100	100
Ethanol	22	100	100	100
Isopropanol	22	100	100	100
Freon TA	22	100	100	100
Heat/humidity 95% RH	40	80	75	65
Heat/humidity 95% RH on polycarbonate	40	100	100	100

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. For best performance bond surfaces should be clean and free from grease.
2. This product performs best in thin bond gaps (0.05 mm).
3. Excess adhesive can be dissolved with Loctite cleanup solvents, nitromethane or acetone.

Loctite Material Specification[LMS]

LMS dated May 16, 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

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Reference 1.1