

LOCTITE® 414

November 2010

PRODUCT DESCRIPTION

LOCTITE[®] 414 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, Rubbers and Metals		

LOCTITE® 414 is a general purpose cyanoacrylate instant adhesive.

Commercial Item Description A-A-3097:

LOCTITE[®] 414 has been qualified to Commercial Item Description A-A-3097. **Note:** This is a regional approval. Please contact your local Technical Service Center for more information and clarification.

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	70 to 110 ^{LMS}
Viscosity, Brookfield - LVF, 25 °C, mPa·s (cP):	
Spindle 1, speed 30 rpm,	100 to 150
Flash Point - See SDS	

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 $^{\circ}\text{C}$ / 50 % relative humidity. This is defined as the time to develop a shear strength of 0.1 N/mm² .

Fixture Time, seconds:

Steel (degreased)	15 to 30
Aluminum	2 to 10
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. 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
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 60	250:
0.05 kHz	2.3 / < 0.02
1 kHz	2.3 / < 0.02
10 kHz	2.3 / < 0.02
Volume Resistivity, IEC 60093, Ω·cm	10×10 ¹⁵
Dielectric Breakdown Strength,	25
IEC 60243 1 kV//mm	

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)
ABS	N/mm²	>6
	(psi)	(>870)
PVC	N/mm²	>4
	(psi)	(>580)
Polycarbonate	N/mm²	>5
•	(psi)	(>725)
Phenolic	N/mm²	5 to 15
	(psi)	(725 to 2,175)



Neoprene	N/mm² (psi)	>10 (>1,450)
Nitrile	N/mm² (psi)	>10 (>1,450)

Tensile Strength, ISO 6922:

Steel (grit blasted) N/mm² 12 to 25 (psi) (1,745 to 3,625)

After 10 seconds @ 22 °C
Tensile Strength, ISO 6922:

Buna-N N/mm² ≥6.0^{LMS} (psi) (≥870)

spirits 1,1,1 Trichloroethane 22 100 100 100 Freon TA 22 100 100 100 Heat/humidity 95% RH 40 80 75 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.

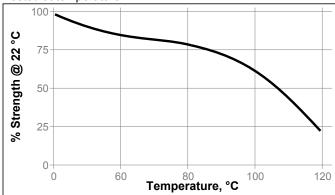
For safe handling information on this product, consult the Safety Data Sheet (SDS).

TYPICAL ENVIRONMENTAL RESISTANCE

Cured for 1 week @ 22 °C Lap Shear Strength, ISO 4587: Mild Steel (grit blasted)

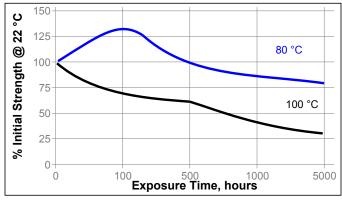
Hot Strength

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
Isopropanol	22	100	100	100
Industrial methylated	22	100	100	100

Directions for use:

- 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 August 29, 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

 $(^{\circ}C \times 1.8) + 32 = ^{\circ}F$ $kV/mm \times 25.4 = V/mil$ mm / 25.4 = inches $\mu m / 25.4 = mil$ $N \times 0.225 = lb$ $N/mm \times 5.71 = lb/in$ $N/mm^2 \times 145 = psi$ $MPa \times 145 = psi$ $N \cdot m \times 8.851 = lb \cdot in$ $N \cdot m \times 0.738 = lb \cdot ft$ $N \cdot mm \times 0.742 = oz \cdot in$ $mPa \cdot s = cP$

Note:

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based

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Reference 1.2