



Product 454

July 2003

PRODUCT DESCRIPTION

LOCTITE® 454 Instant Adhesive provides the following product characteristics:

Technology	Cyanoacrylate
Chemical Type	Ethyl Cyanoacrylate
Appearance (uncured)	Clear to slightly cloudy, colorless to straw colored gel ^{LMS}
Components	One part - requires no mixing
Viscosity	High
Cure	Humidity
Application	Bonding
Key Substrates	Wood, Paper, Leather and Fabric

Product 454 is designed for the assembly of difficult-to-bond materials which require uniform stress distribution and strong tension and/or shear strength. The product provides rapid bonding of a wide range of materials, including metals, plastics and elastomers. Product 454 is particularly suited for bonding porous or absorbent materials such as wood, paper, leather and fabric. The gel consistency prevents adhesive flow even on vertical surfaces.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25°C	1.10
Infinite Shear Viscosity (Casson model), mPa.s:	
Cone & Plate Rheometer	100 to 250 ^{LMS}
Viscosity @ 25°C, mPa.s:	
Brookfield RVT:	
Spindle TC @ 20 rpm, Helipath	18,000 to 40,000
Flash Point (TCC), °C	>80

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 0.1N/mm²

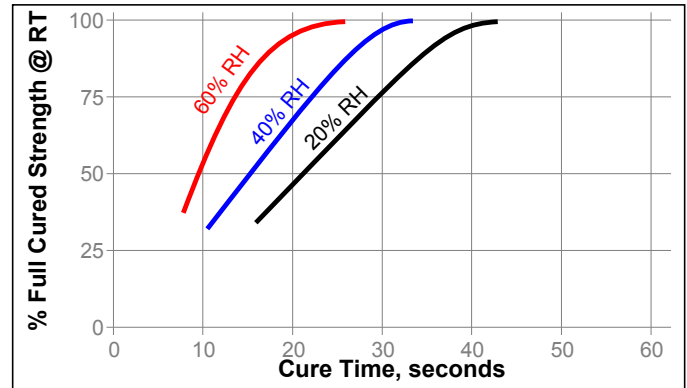
Fixture Time, ASTM D 1002/ EN 1465, seconds:	
Steel (degreased)	5 to 20
Aluminum	2 to 10
Zinc Dichromate	10 to 20
Neoprene	<5
Rubber, Nitrile	<5
ABS	2 to 10
PVC	2 to 10
Polycarbonate	10 to 40
Phenolic Materials	2 to 10

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

Cured for 24 hours @ 22°C.

Physical Properties:

Coefficient of Thermal Expansion, ASTM D 696, K ⁻¹	80×10 ⁻⁶
Coefficient of Thermal Conductivity, ASTM C177, W.m ⁻¹ K ⁻¹	0.10
Glass Transition Temperature, (Tg), ASTM E 228, °C	120

Electrical Properties:

Dielectric Constant / Loss, ASTM D 150:	
100 Hz	2.65 / <0.02
1kHz	2.75 / <0.02
10 kHz	2.65 / <0.02
Volume Resistivity, ASTM D 257, Ωcm	1×10 ¹⁶
Surface Resistivity, ASTM D 257, Ω	1×10 ¹⁶
Dielectric Strength, ASTM D 149, kV/mm	25

PERFORMANCE OF CURED MATERIAL

Cured for 24 hours @ 22°C.

Adhesive Properties:Shear Strength, ASTM D 1002/ EN 1465, N/mm² :

Steel (grit blasted)	18 to 26
Aluminum (etched)	11 to 19
Zinc Dichromate	4 to 10
ABS	6 to 20
PVC	6 to 20
Polycarbonate	5 to 20
Phenolic Materials	5 to 15
Rubber, Neoprene	5 to 15
Rubber, Nitrile	5 to 15

Tensile Strength, ASTM D 2095, DIN 53288, N/mm² :

Steel (grit blasted)	12 to 25
Rubber, Buna N	5 to 15

Cured for 10 seconds @ 22°C.

Adhesive Properties:Tensile Strength, ASTM D 2095, DIN 53288, N/mm² :

Rubber, Buna N	≥6.00 ^{LMS}
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TYPICAL ENVIRONMENTAL RESISTANCE

Cured 1 week @ 22°C.

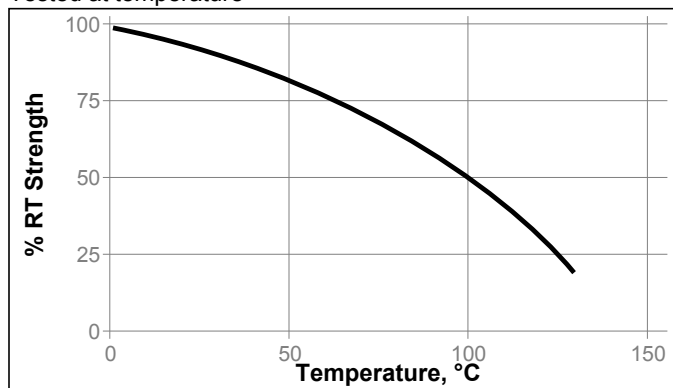
Adhesive Properties:

Shear Strength, ASTM D 1002/ EN 1465:

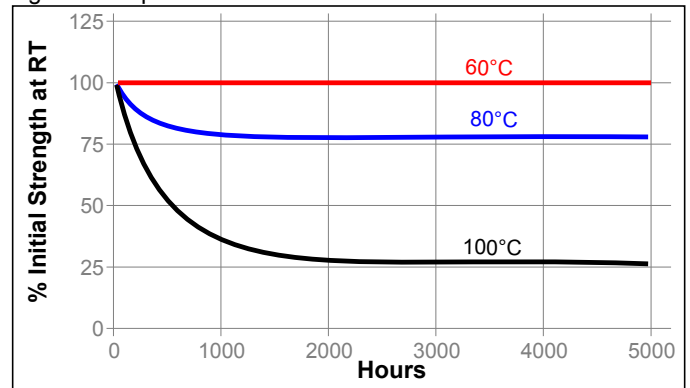
Grit Blasted Mild Steel (GBMS)

Hot Strength

Tested at temperature

**Heat Aging**

Aged at temperature indicated and tested at 22°C

**Chemical/Solvent Resistance**

Aged under conditions indicated and tested at 22°C.

Environment	°C	% of initial strength		
		100 hr	500 hr	1000 hr
Motor Oil	40	85	85	75
Gasoline	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	65	55	50
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.

Storage

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

Products shall be maintained, optimally, at temperatures between 2°C to 8°C unless otherwise labeled, or, specified. Storage, at temperatures below 2°C, or, greater than 8°C, is not recommended. Temperatures below 2°C and above 8°C can adversely affect product properties.

Material removed from containers may be contaminated during use. Do not return product to the original container. Loctite 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.

Loctite Material Specification^{LMS}

LMS dated April 10, 2000. 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 Loctite Quality.

Conversions

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$
 $\text{kV/mm} \times 25.4 = \text{V/mil}$
 $\text{mm} \times 0.039 = \text{inches}$
 $\text{mPas} = \text{cP}$
 $\text{N/mm}^2 \times 145 = \text{psi}$
 $\text{N} \times 0.225 = \text{lbs}$

Note

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 Loctite 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 Loctite Corporation's products. Henkel Loctite 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 Loctite 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.

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Reference 0.0