

# Technical Data Sheet

## Product 460

Worldwide Version, October 1998

### PRODUCT DESCRIPTION

LOCTITE® Product 460 is a low viscosity, fast curing, single component cyanoacrylate adhesive. It is specifically formulated to have low odour.

### TYPICAL APPLICATIONS

Rapid bonding of a wide range of metal, plastic or elastomeric materials with low blooming characteristics for cosmetic applications.

### PROPERTIES OF UNCURED MATERIAL

	Value	Typical Range
Chemical Type	Alkoxy-ethyl cyanoacrylate	
Appearance	Clear colourless liquid	
Specific Gravity @ 25°C	1.10	
Viscosity @ 25°C, mPa s (cP)		
Brookfield LVT		
Spindle 1 @ 30 rpm	45	30 to 60
Flash Point (TCC), °C	>80	

### TYPICAL CURING PERFORMANCE

Under normal conditions, the surface moisture initiates the hardening 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 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 (14.5 psi) tested according to ASTM D1002.

Substrate	Fixture Time, seconds
Steel (degreased)	30 to 70
Aluminium	5 to 20
Zinc dichromate	60 to 180
Neoprene	<5
Nitrile rubber	<5
ABS	20 to 60
PVC	20 to 50
Polycarbonate	20 to 60
Phenolic materials	30 to 60

### Cure speed vs. bond gap

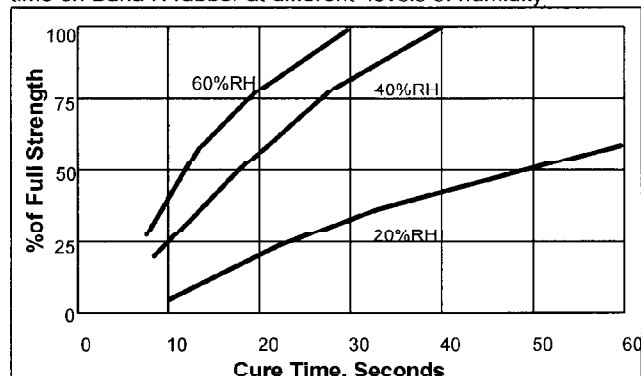
The rate of cure will depend on the bondline gap. High cure speed is favoured by thin bond lines. Increasing the bond gap will slow down the rate of cure.

### Cure speed vs. activator

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

### Cure speed vs. humidity

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



### TYPICAL PROPERTIES OF CURED MATERIAL

#### Physical Properties

Coefficient of thermal expansion, ASTM D696, K <sup>-1</sup>	80 x 10 <sup>-6</sup>
Coefficient of thermal conductivity, ASTM C177, W m <sup>-1</sup> K <sup>-1</sup>	0.1
Glass transition temperature, ASTM E228, °C	130

#### Electrical Properties

	Constant	Loss
Dielectric constant & loss, 25°C, ASTM D150, measured at		
100Hz	2.65	<0.02
1kHz	2.75	<0.02
10kHz	2.75	<0.02
Volume resistivity, ASTM D257, Ω cm		1 x 10 <sup>16</sup>
Surface resistivity, ASTM D257, Ω		1 x 10 <sup>16</sup>
Dielectric strength, ASTM D149, kV/mm		25

### PERFORMANCE OF CURED MATERIAL

(After 24 hr at 22°C)	Value	Typical Range
Shear Strength, ASTM D1002/DIN 53203		
Grit Blasted Steel, N/mm²	18	14 to 22
(psi)	(2600)	(2000 to 3200)
Etched Aluminium, N/mm²	12	9 to 15
(psi)	(1700)	(1300 to 2200)
Zinc dichromate, N/mm²	7	4 to 10
(psi)	(1000)	(600 to 1450)
ABS, N/mm²	13	6 to 20
(psi)	(1900)	(900 to 3000)
PVC, N/mm²	5	2 to 8
(psi)	(700)	(300 to 1200)
Polycarbonate, N/mm²	6.5	3 to 10
(psi)	(900)	(400 to 1450)
Phenolic, N/mm²	10	5 to 15
(psi)	(1450)	(700 to 2200)
Neoprene rubber, N/mm²	10	5 to 15
(psi)	(1450)	(700 to 2200)
Nitrile rubber, N/mm²	10	5 to 15
(psi)	(1450)	(700 to 2200)
Tensile Strength, ASTM D2095, DIN 53288		
Grit Blasted Steel, N/mm²	17.5	10 to 25
(psi)	(2600)	(1450 to 3600)
Buna N rubber, N/mm²	10	5 to 15
(psi)	(1450)	(700 to 2200)

NOT FOR PRODUCT SPECIFICATIONS

THE TECHNICAL DATA CONTAINED HEREIN ARE INTENDED AS REFERENCE ONLY.

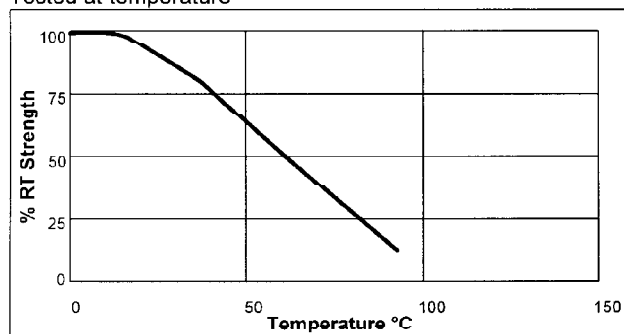
PLEASE CONTACT LOCTITE CORPORATION, QUALITY DEPARTMENT FOR ASSISTANCE AND RECOMMENDATIONS ON SPECIFICATIONS FOR THIS PRODUCT.  
 ROCKY HILL, CT FAX +1 (860)-571-5473 DUBLIN, IRELAND FAX +353-(1)-451-9959

## TYPICAL ENVIRONMENTAL RESISTANCE

Test Procedure Shear Strength ASTM D1002/DIN 53283  
 Substrate Grit blasted mild steel laps  
 Cure procedure 1 week at 22°C

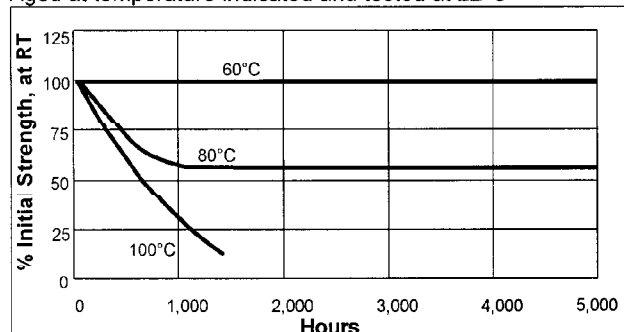
### Hot Strength

Tested at temperature



### Heat Ageing

Aged at temperature indicated and tested at 22°C



### Chemical / Solvent Resistance

Aged under conditions indicated and tested at 22°C

Solvent	Temp	% Initial strength retained at		
		100 hr	500 hr	1000 hr
Motor Oil	40°C	75	75	65
Leaded Petrol	22°C	100	90	75
Ethanol	22°C	90	90	90
Isopropanol	22°C	90	90	90
Freon TA	22°C	100	100	100
Humidity 95% RH	40°C	15	0	0
Humidity 95% RH polycarbonate	40°C	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 oxidising materials.

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

### Directions for use

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

### Storage

Product shall be ideally stored in a cool, dry location in unopened containers at a temperature between 8°C to 21°C (46°F to 70°F) unless otherwise labelled. Optimal storage conditions for unopened containers of cyanoacrylate products are achieved with refrigeration 2°C to 8°C (36°F to 46°F). Refrigerated packages shall be allowed to return to room temperature prior to opening and use. To prevent contamination of unused product, do not return any material to its original container. For specific shelf life information contact your local Technical Service Centre.

### Data Ranges

The data contained herein may be reported as a typical value and/or range (based on the mean value  $\pm 2$  standard deviations). Values are based on actual test data and are verified on a periodic basis.

### 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, 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 Loctite Corporation's products. 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 licence under any 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.