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Technical Data Sheet

Product 4502

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PRODUCT DESCRIPTION

LOCTITE® Product 4502 is a low viscosity, fast curing, single component cyanoacrylate adhesive. It is specifically formulated for difficult to bond substrates.

TYPICAL APPLICATIONS

Rapid bonding of a wide range of metal, plastic or elastomeric materials, particularly suited for bonding porous or absorbent materials such as wood, paper, leather or fabric.

PROPERTIES OF UNCURED MATERIAL

	Value	Typical Range
Chemical Type	Ethyl cyanoacrylate	
Appearance	Clear Colorless liquid	
Specific Gravity @ 25°C	1.1	
Viscosity @ 25°C, cP (mPa.s)	100	70 to 130
Physica Viscometer, MK-22 Cone, 3000 s ⁻¹		
Flash Point (TCC), °C	>93	

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 13.2 psi tested on specimens according to ASTM D1002.

Substrate	Fixture Time, s
Steel (grit-blasted)	<5
Aluminum (grit-blasted)	<5
Zinc dichromate	5 to 10
Neoprene	<5
Nitrile rubber	<5
ABS	<5
PVC	<5
Phenolic materials	<5
Wood (Pine)	5 to 10
Wood (Oak)	10 to 20

Cure speed vs. humidity

The rate of cure will depend on the ambient relative humidity. Higher relative humidity results in faster cure speed. Although testing is required in each application, relative humidity levels below 20% may result in significantly longer cure times.

Cure speed vs. activator

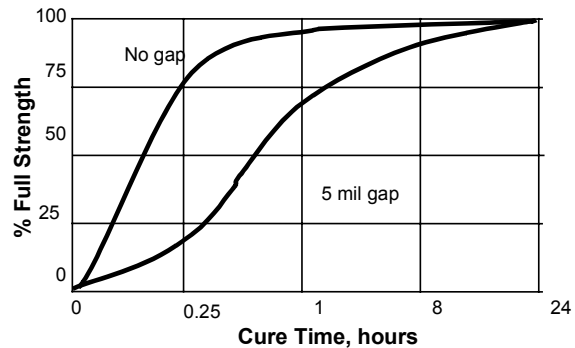
Where cure speed is unacceptably long due to large gaps, applying activator to the surface will improve cure speed. However, this can reduce the ultimate strength of the bond, therefore testing is recommended to confirm effect.

Cure speed vs. bond gap

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

Cure speed vs. Time

The graph below shows the strength developed over time on grit-blasted steel. The testing was conducted in accordance with ASTM D 1002 with no induced gap and at 22°C.



TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties

Coefficient of thermal expansion, ASTM D696, mm/mm°C, pre Tg	80
Glass Transition temperature, ASTM E228, °C	127

Electrical Properties

	Constant	Loss
Dielectric constant & loss, 25°C, ASTM D150, measured at 10 kHz	3.2	0.028
1 kHz	3.1	0.028
Volume resistivity, ASTM D257, Ω.cm	1.0 x 10 ¹⁶	
Surface resistivity, ASTM D257, Ω	1.9 x 10 ¹⁶	
Dielectric strength, ASTM D149, kV/mm	780	

PERFORMANCE OF CURED MATERIAL

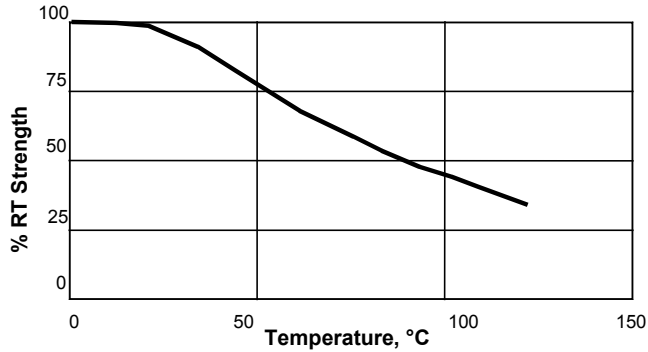
(After 48 hr at 22°C)	Value	Typical Range
Shear Strength, ASTM D1002, DIN 53283		
Grit Blasted Steel, N/mm ²	19.4	18.4 to 20.4
(psi)	(2810)	(2670 to 2960)
Grit Blasted Aluminum, N/mm ²	16.5	15.4 to 17.5
(psi)	(2390)	(2240 to 2540)
Zinc dichromate, N/mm ²	4.7	4.1 to 5.3
(psi)	(680)	(590 to 770)
Neoprene rubber, N/mm ²	>0.8	0.7 to 0.8
(psi)	(110)	(100 to 120)
Nitrile rubber, N/mm ²	>0.4	0.3 to 0.6
(psi)	(65)	(45 to 85)
Shear Strength, ASTM D4501		
ABS, N/mm ²	28.8	26.8 to 30.8
(psi)	(4180)	(3890 to 4470)
PVC, N/mm ²	19.0	10.1 to 27.9
(psi)	(2750)	(1460 to 4040)
Polycarbonate, N/mm ²	27.2	24.9 to 29.4
(psi)	(3940)	(3610 to 4270)
Phenolic, N/mm ²	9.4	7.1 to 11.8
(psi)	(1370)	(1030 to 1710)

TYPICAL ENVIRONMENTAL RESISTANCE

Test Procedure : Shear Strength ASTM D1002/DIN 53283
 Substrate: Grit blasted mild steel laps
 Cure procedure: 48 hours at 22°C

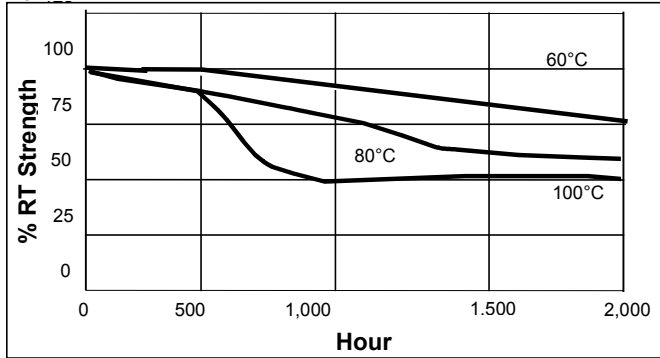
Hot Strength

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. Substrate is grit-blasted steel except where noted.

Solvent	Temp.	% Initial strength retained at	
		2 weeks	4 weeks
Motor Oil	40°C	130	120
Gasoline	22°C	110	105
Isopropanol	22°C	100	100
Salt Fog, 5% salt, 95% R.H.	40°C	90	70
Salt Fog, 5% salt, 95% R.H. polycarbonate	40°C	135	110
Humidity 95% RH	40°C	80	70
Humidity 95% RH polycarbonate	40°C	120	120

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

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 labeled. 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 Center.

Data Ranges

The data contained herein may be reported as a typical value and/or range (based on the mean value ±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 license 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. One or more United States or foreign patents or patent applications may cover this product.