

PRODUCT DESCRIPTION

LOCTITE® Product 277 is a single component, high viscosity anaerobic threadlocking material which develops high strength. This product cures when confined in the absence of air between close fitting metal surfaces.

TYPICAL APPLICATIONS

Prevents loosening and leakage of threaded fasteners. Typical applications include locking and sealing of large bolts and studs, (M25 and larger).

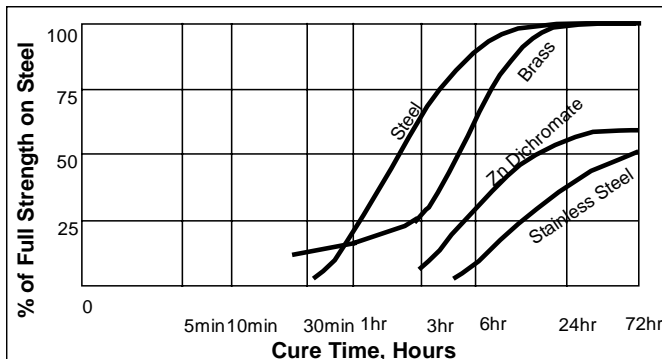
PROPERTIES OF UNCURED MATERIAL

	Value	Typical Range
Chemical Type	Dimethacrylate Ester	
Appearance	Red Fluorescent	
	Liquid	
Specific Gravity @ 25°C	1.12	
Viscosity @ 25°C mPa.s (cP)		
Brookfield RVT		
Spindle 4 @ 20 rpm	7,000	6,000 to 8,000
Flash Point (TCC), °C	>93	

TYPICAL CURING PERFORMANCE

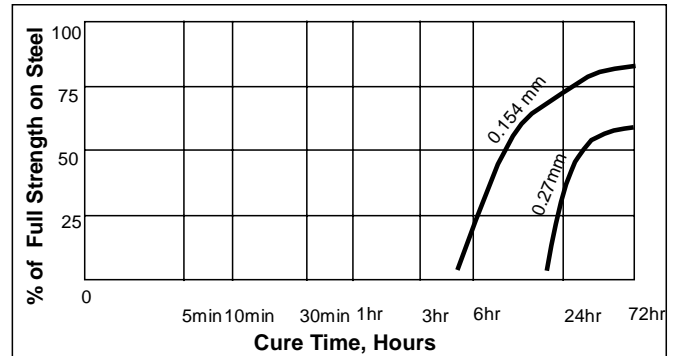
Cure speed vs. substrate

The rate of cure will depend on substrate used. The graph below shows the breakaway strength developed with time on M10 steel nuts and bolts compared to different materials and tested according to ISO 10964.



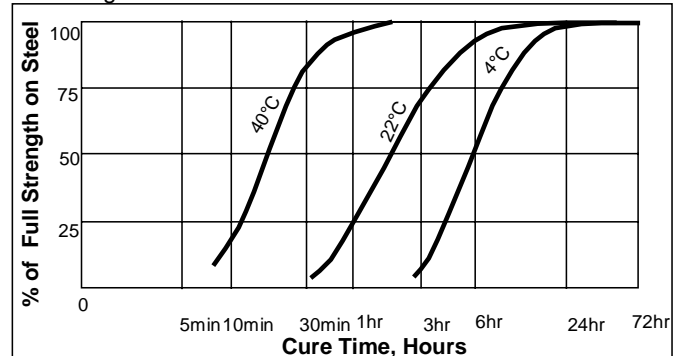
Cure speed vs. bond gap

The rate of cure will depend on the bondline gap. Gaps in threaded fasteners depend on thread type, quality and size. The following graph shows shear strength developed with time on steel pins and collars at different controlled gaps and tested according to ISO 10123.



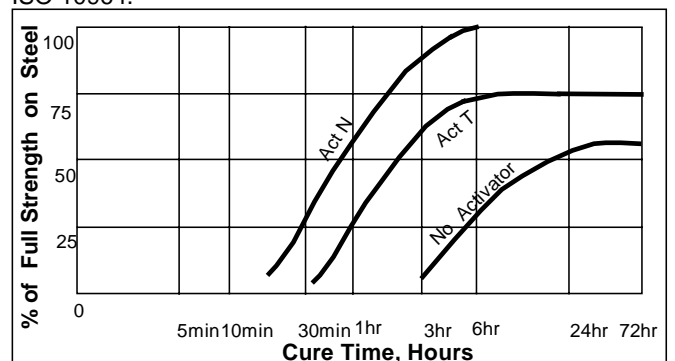
Cure speed vs. temperature

The rate of cure will depend on the temperature. The graph below shows the breakaway strength developed with time at different temperatures on M10 steel nuts and bolts and tested according to ISO 10964.



Cure speed vs. activator

Where cure speed is unacceptably long, or large gaps are present, applying activator to the surface will improve cure speed. The graph below shows breakaway strength developed with time using ACTIVATOR N and T on M10 Zinc Dichromate steel nuts & bolts and tested according to ISO 10964.



TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties

Coefficient of thermal expansion, ASTM D696, K ⁻¹	80 x 10 ⁻⁶
Coefficient of thermal conductivity, ASTM C177, W.m ⁻¹ K ⁻¹	0.1
Specific Heat, kJ.kg ⁻¹ K ⁻¹	0.3

PERFORMANCE OF CURED MATERIAL

(After 24 hrs @22°C on M10 steel nuts & bolts)

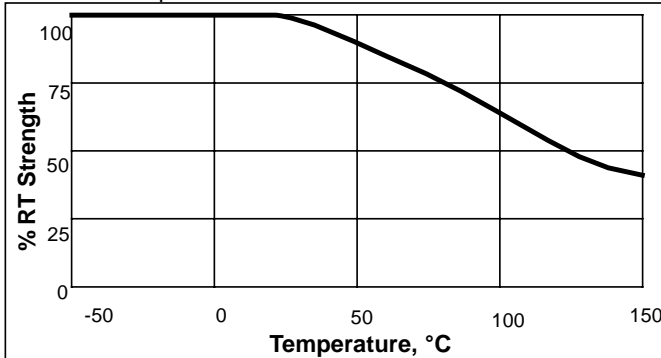
	Typical	
	Value	Range
Breakaway Torque, ISO 10964, N.m	32	23 to 40
(lb.in)	(275)	(200 to 350)
Prevail Torque, ISO 10964 (4.5), N.m	32	23 to 40
(lb.in)	(275)	(200 to 350)
Breakloose Torque, DIN 54454, N.m	38	28 to 48
(lb.in)	(340)	(250 to 430)
Max. Prevail Torque, DIN 54454, N.m	40	30 to 50
(lb.in)	(350)	(270 to 440)

TYPICAL ENVIRONMENTAL RESISTANCE

Test Procedure: Breakaway torque, DIN 54454
 Substrate: M10 Zinc Phosphate Nuts&Bolts
 Cure Procedure: 1 week at 22°C

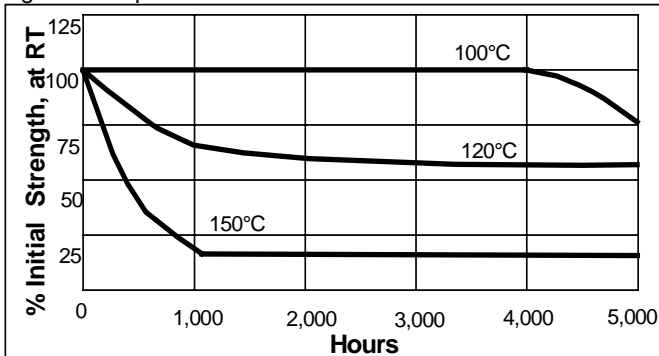
Hot Strength

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	125°C	100	100	100
Unleaded Gasoline	22°C	100	100	100
Brake Fluid	22°C	100	100	100
Water/Glycol (50%/50%)	87°C	90	90	90
Acetone	22°C	95	95	95
Ethanol	22°C	95	95	95
10% Sodium Hydroxide	40°C	100	100	70
10% Hydrochloric Acid	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).

Where aqueous washing systems are used to clean the surfaces before bonding, it is important to check for compatibility of the washing solution with the adhesive. In some cases these aqueous washes can affect the cure and performance of the adhesive.

This product is not normally recommended for use on plastics (particularly thermoplastic materials where stress cracking of the plastic could result). Users are recommended to confirm compatibility of the product with such substrates.

Directions for use

For best performance surfaces should be clean and free of grease. Product should be applied to the bolt in sufficient quantity to fill all engaged threads. This product performs best in thin bond gaps, (0.05mm). Very large thread sizes may create large gaps which will affect cure speed and strength. This product is designed to give controlled friction, (torque/tension ratio), during assembly. In critical tightening applications this ratio should be confirmed.

Storage

Product shall be ideally stored in a cool, dry location in unopened containers at a temperature between 8°C to 28°C (46°F to 82°F) unless otherwise labelled. Optimal storage is at the lower half of this temperature range. To prevent contamination of unused product, do not return any material to its original container. For further 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 ±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. This product may be covered by one or more United States or foreign patents or patent applications.