Technical Data Sheet

LOCTITE® 511™

September 2005

PRODUCT DESCRIPTION

LOCTITE® 511™ provides the following product characteristics:

Technology	Acrylic
Chemical Type	Dimethacrylate ester
Appearance (uncured)	White to off-white paste
Components	One component - requires no mixing
Viscosity	Medium, thixotropic
Cure	Anaerobic
Application	Sealing
Strength	Low

LOCTITE® 511™ is designed for the locking and sealing of metal threaded pipes and fittings. The product cures rapidly when confined in the absence of air between close fitting metal surfaces.

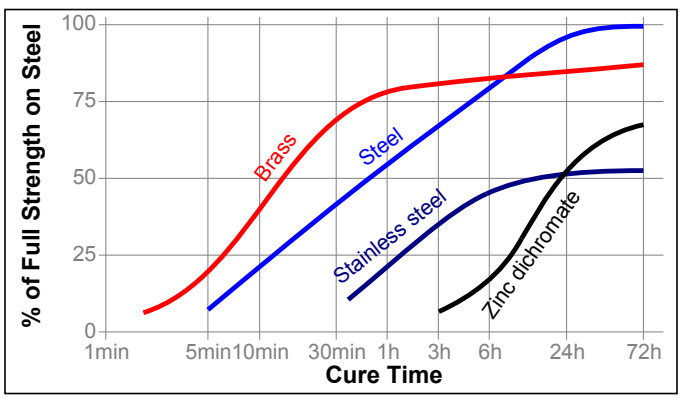
TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.08
Flash Point - See SDS	
Viscosity, Brookfield - RVT,25°C,mPa·s (cP):	
Spindle 6, speed 2.5 rpm	40,000 to 100,000
Spindle 6, speed 20 rpm	9,000 to 22,000

TYPICAL CURING PERFORMANCE

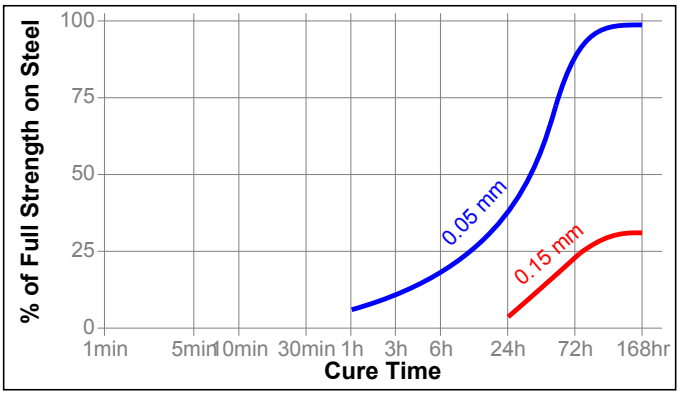
Cure Speed vs. Substrate

The rate of cure will depend on the 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.



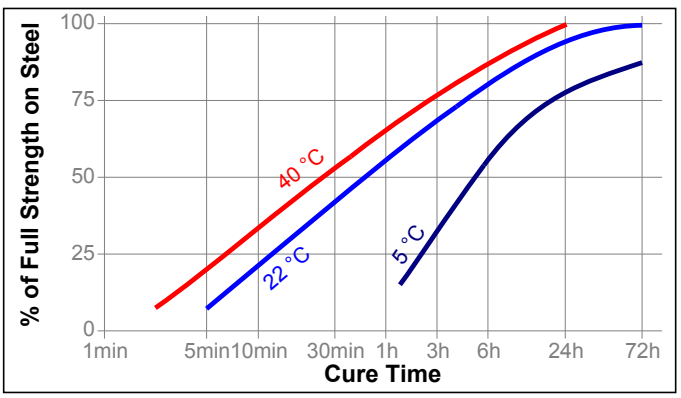
Cure Speed vs. Bond Gap

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 the shear strength developed with time on steel pins and collars at different controlled gaps and tested according to ISO 10123.



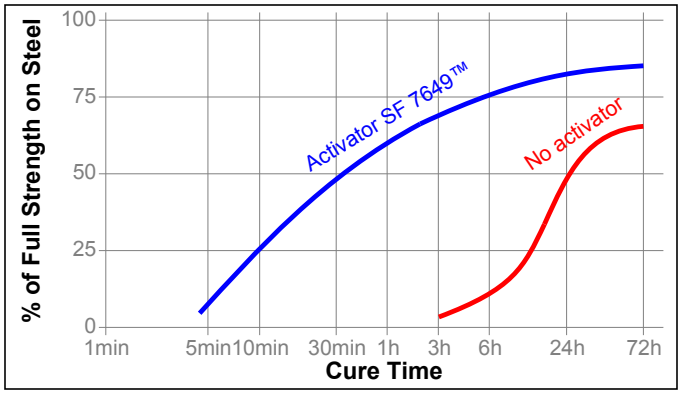
Cure Speed vs. Temperature

The rate of cure will depend on the ambient 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 the breakaway strength developed with time on M10 zinc dichromate plated steel nuts and bolts using Activator 7649™ and tested according to ISO 10964. The use of Activator 7471™ is not recommended with this product.



TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties:

Coefficient of Thermal Expansion, ISO 11359-2, K^{-1}	110×10^{-6}
Coefficient of Thermal Conductivity, ISO 8302, W/(m·K)	0.3
Specific Heat, kJ/(kg·K)	0.3

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured for 24 hours @ 22°C

Breakaway Torque, ISO 10964:

	N·m	6
	(lb.in)	(53)

Prevail Torque, ISO 10964:

	N·m	2
	(lb.in)	(17)

Breakloose Torque, ISO 10964, Pre-torqued to 5 N·m:

	N·m	10
	(lb.in)	(88)

Max. Prevail Torque, ISO 10964, Pre-torqued to 5 N·m:

	N·m	2
	(lb.in)	(17)

Compressive Shear Strength, ISO 10123:

Steel pins and collars	N/mm^2	≥2.5
	(psi)	(≥360)

TYPICAL ENVIRONMENTAL RESISTANCE

The following tests refer to the effect of environment on strength. This is not a measure of sealing performance.

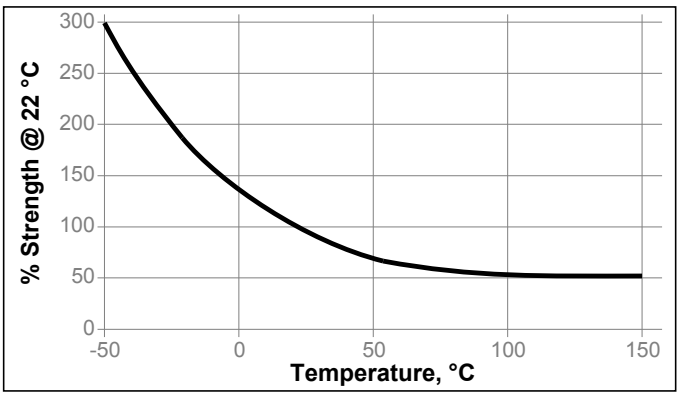
Cured for 72 hours @ 22°C

Breakaway Torque, ISO 10964:

M10 black oxide nuts and bolts

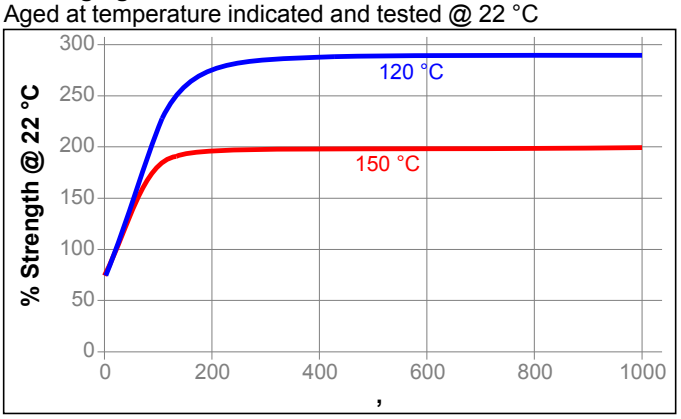
Hot Strength

Tested at temperature



Heat Aging

Aged at temperature indicated and tested @ 22 °C



Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 23 °C.

		% of initial strength		
Environment	**°C**	**100 h**	**500 h**	**1000 h**
Motor oil	87	200	200	200
Motor oil	120	210	240	240
Unleaded gasoline	22	50	70	60
Brake fluid	22	50	70	40
Water/glycol 50/50	87	140	140	140

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).

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 Assembly

1. For best results, clean all surfaces (external and internal) with a LOCTITE® cleaning solvent and allow to dry.
2. If the material is an inactive metal or the cure speed is too slow, spray all threads with Activator 7649™ and allow to dry.
3. Shake the product thoroughly before use.
4. To prevent the product from clogging in the nozzle, do not allow the tip to touch metal surfaces during application.
5. **For Thru Holes**, apply several drops of the product onto the bolt at the nut engagement area.
6. **For Blind Holes**, apply several drops of the product down the internal threads to the bottom of the hole.
7. **For Sealing Applications**, apply a 360° bead of product to the leading threads of the male fitting, leaving the first thread free. Force the material into the threads to thoroughly fill the voids. For bigger threads and voids, adjust product amount accordingly and apply a 360° bead of product on the female threads also.
8. Assemble and tighten as required.

For Disassembly

1. Remove with standard hand tools.
2. In rare instances where hand tools do not work because of excessive engagement length, apply localized heat to nut or bolt to approximately 250 °C. Disassemble while hot.

Clean-up

1. Cured product can be removed with a combination of soaking in a LOCTITE® solvent and mechanical abrasion such as a wire brush.

Loctite Material Specification[LMS]

LMS dated September 01, 1995. 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: 8 °C to 21 °C. Storage below 8 °C or greater than 28 °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 Henkel Representative.

Conversions

(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
µm / 25.4 = mil
N x 0.225 = lb
N/mm x 5.71 = lb/in
N/mm² x 145 = psi
MPa x 145 = psi
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·s = cP

Disclaimer

Corporation, the following disclaimer is applicable:
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 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 Corporation's products. Henkel 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 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.

Trademark usage
Except as otherwise noted, all trademarks in this document are trademarks of Henkel Corporation in the U.S. and elsewhere. ® denotes a trademark registered in the U.S. Patent and Trademark Office.

Reference 1.1