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LOCTITE

Technical Data Sheet

LOCTITE® 273

June 2004

PRODUCT DESCRIPTION

LOCTITE® 273 provides the following product characteristics:

Technology	Acrylic
Chemical Type	Dimethacrylate ester
Appearance (uncured)	Red liquid[LMS]
Fluorescence	Positive under UV light[LMS]
Components	One component - requires no mixing
Viscosity	Medium
Cure	Anaerobic
Secondary Cure	Activator
Application	Threadlocking
Strength	High

LOCTITE® 273 is designed for the permanent locking and sealing of threaded fasteners. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include the locking and sealing of large bolts and studs (M25 and larger).

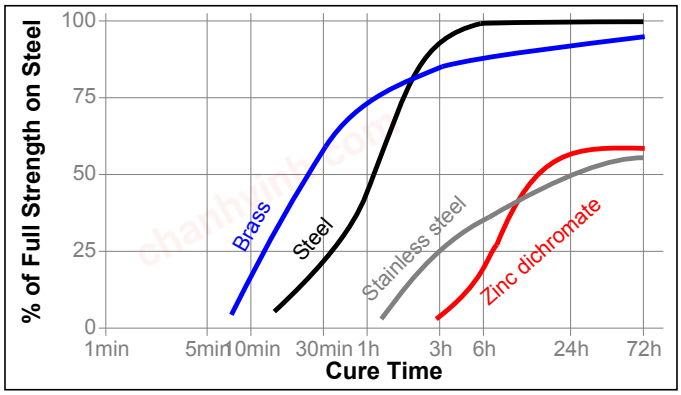
TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.1
Flash Point - See SDS	
Viscosity @ 25°C, mPa·s (cP)	400 to 600[LMS]
Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP):	
Spindle 5, speed 20 rpm	5,000 to 10,000

TYPICAL CURING PERFORMANCE

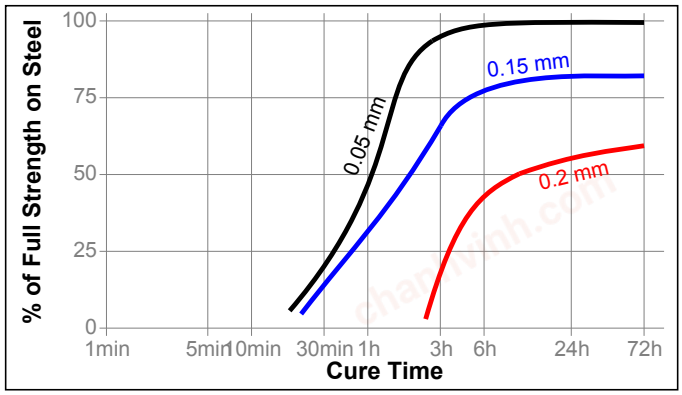
Cure Speed vs. Substrate

The rate of cure will depend on the substrate used. The graph below shows the breakaway strength developed with time on M10 black oxide nuts and bolts compared to different materials and tested according to MIL-S-46163.



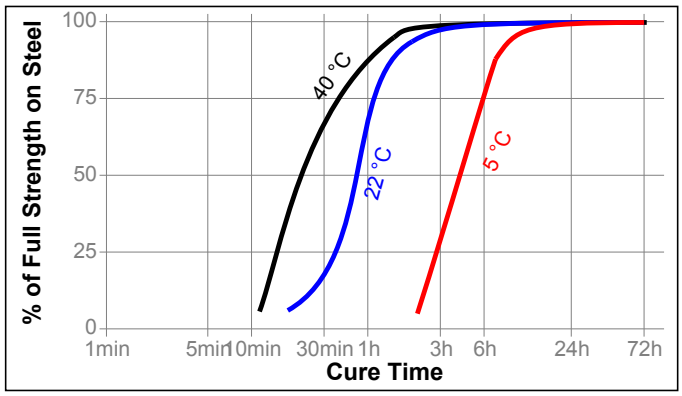
Cure Speed vs. Bond Gap

The rate of cure will depend on the bondline gap. Gaps in threaded fasteners depends 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 MIL-R-46082.



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 black oxide nuts and bolts and tested according to MIL-S-46163.

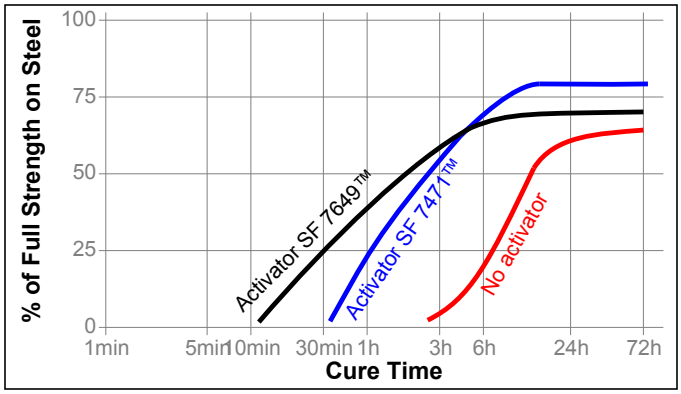


Cure Speed vs. Activator

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 steel nuts and bolts using Activator SF 7471™ or SF 7649™ and tested according to MIL-S-46163.

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TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties:

Coefficient of Thermal Expansion, ISO 11359-2, K^{-1}	100×10^{-6}
Coefficient of Thermal Conductivity, ISO 8302, W/(m·K)	0.1
Specific Heat, kJ/(kg·K)	0.3

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

After 24 hours @ 22 °C

Breakaway Torque, ISO 10964:

M10 black nuts and bolts	oxide	steel	N·m (lb.in.)	≥12[LMS] (≥106)

Prevail Torque, ISO 10964:

M10 black nuts and bolts	oxide	steel	N·m (lb.in.)	≥20[LMS] (≥177)

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

M10 black nuts and bolts	oxide	steel	N·m (lb.in.)	28 to 48 (250 to 420)

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

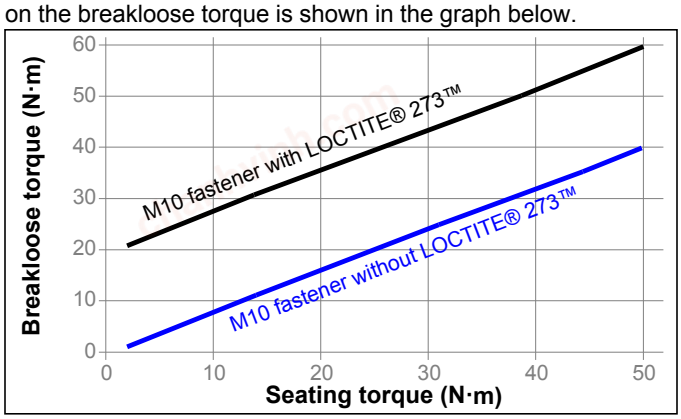
M10 black nuts and bolts	oxide	steel	N·m (lb.in.)	28 to 48 (250 to 420)

Compressive Shear Strength, ISO 10123:

Steel pins and collars	N/mm² (psi)	10 to 20 (1,450 to 2,900)

Torque Augmentation

Breakloose torque of an uncoated fastener will normally be 15 to 30% less than the on-torque. The effect of LOCTITE® 273 on the breakloose torque is shown in the graph below.



TYPICAL ENVIRONMENTAL RESISTANCE

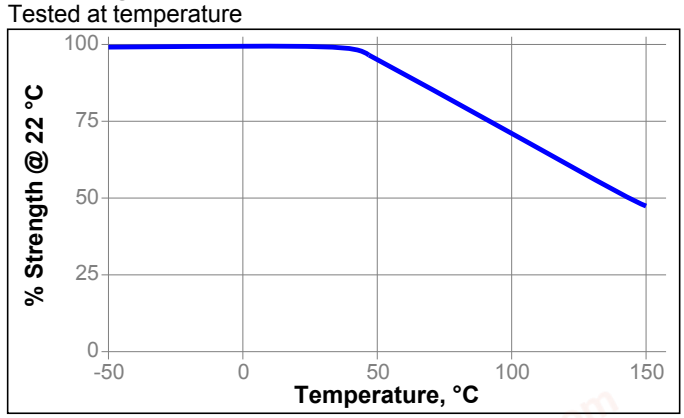
Cured for 1 week @ 22 °C

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

M10 zinc phosphate steel nuts and bolts

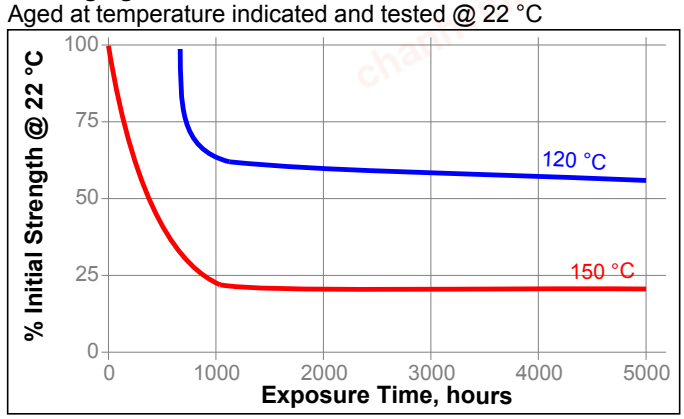
Hot Strength

Tested at temperature



Heat Aging

Aged at temperature indicated and tested @ 22 °C



Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22°C.

		% of initial strength		
Environment	**°C**	**100 h**	**500 h**	**1000 h**
Motor oil (MIL-L-46152)	125	85	85	75
Gasoline	22	100	100	100
Brake fluid	22	100	100	100
Ethanol	22	95	95	95
Acetone	22	95	95	75
1,1,1 Trichloroethane	22	100	95	95
Water/glycol 50/50	87	100	85	85

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

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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 and allow to dry.
3. To prevent the product from clogging in the nozzle, do not allow the tip to touch metal surfaces during application.
4. **For Thru Holes**, apply several drops of the product onto the bolt at the nut engagement area.
5. **For Blind Holes**, apply several drops of the product down the internal threads to the bottom of the hole.
6. **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 thouroughly fill the voids. For bigger threads and voids, adjust product amount accordingly and apply a 360° bead of product on the female threads also.
7. Assemble and tighten as required.

For Disassembly

1. Apply localized heat to nut or bolt to approximately 250 °C. Disassemble while hot.

For Cleanup

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 October 8, 1999. 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 Technical Service Center or Customer Service 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

Note:

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.
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Reference 1