Technical Data Sheet

LOCTITE® 2047™

July 2009

PRODUCT DESCRIPTION

LOCTITE® 2047™ provides the following product characteristics:

Technology	Acrylic
Chemical Type	Dimethacrylate ester
Appearance (uncured)	Black liquid[LMS]
Components	One component- requires no mixing
Viscosity	Medium
Cure	Anaerobic
Secondary Cure	Activator
Application	Threadlocking

LOCTITE® 2047™ is designed for use in threadlocking applications requiring high strength and high lubricity. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. This product is specially formulated with lubricant additives to match the lubricity normally achieved with metal free anti-seize lubricants. LOCTITE® 2047™ has a slow cure profile to allow torquing of multiple bolts in a single assembly prior to curing. On large highly torqued bolts where considerable heat is generated during assembly the slow cure profile is a benefit in preventing premature cure.

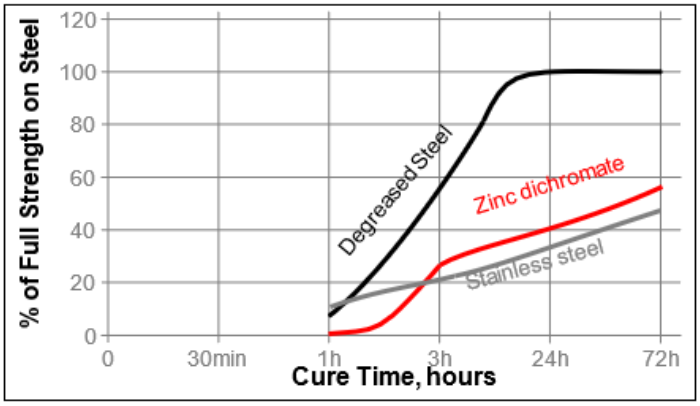
TYPICAL PROPERTIES OF UNCURED MATERIAL

Viscosity, Brookfield - RVT, 25°C , mPa·s (cP): Spindle 4, speed 20, rpm	2,000 to 12,000[LMS]
Flash point - see SDS	

TYPICAL CURING PERFORMANCE

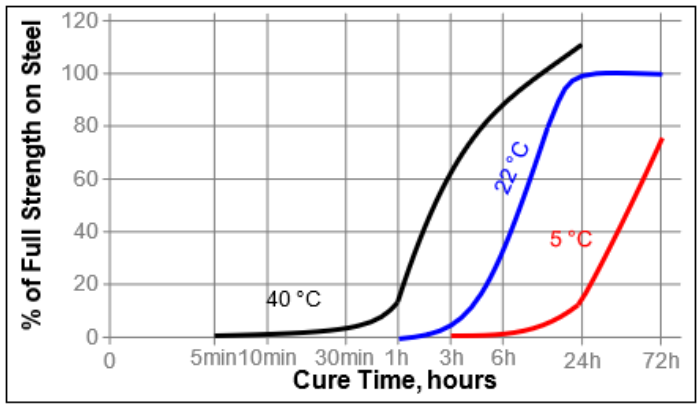
Cure speed vs. substrate

The graph below shows the breakaway strength developed with time on 3/8 x 16 steel nuts & bolts compared to different materials and tested at room temperature according to ISO 10964.



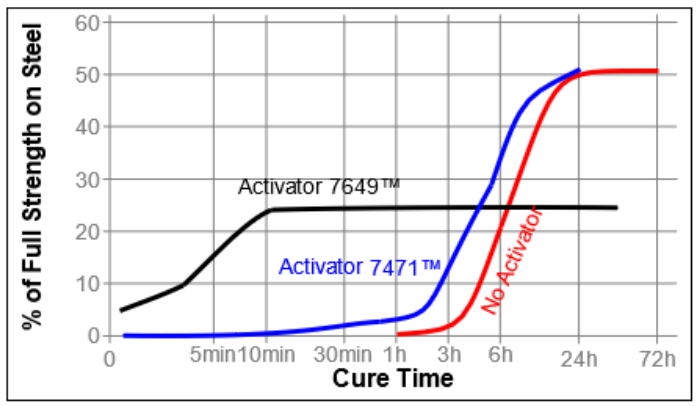
Cure speed vs. temperature

The rate of cure will depend on the temperature. The graph below shows the breakaway strength developed with time at different temperatures on 3/8 x 16 steel nuts & 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 3/8 x 16 zinc dichromate steel nuts and bolts using Activator 7471™ and 7649™ and tested according to ISO 10964.

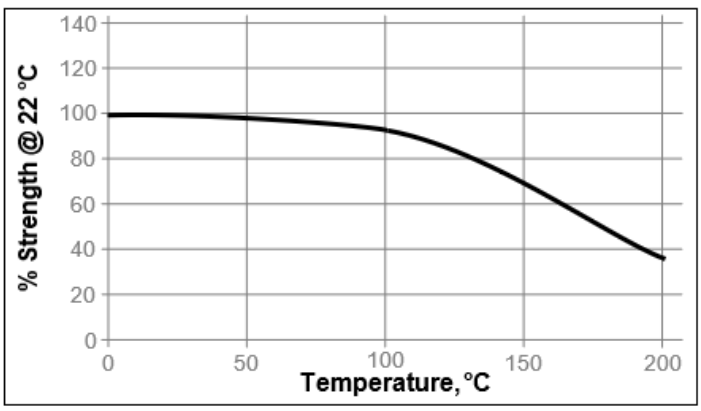


TYPICAL PERFORMANCE OF CURED MATERIAL
Adhesive Properties

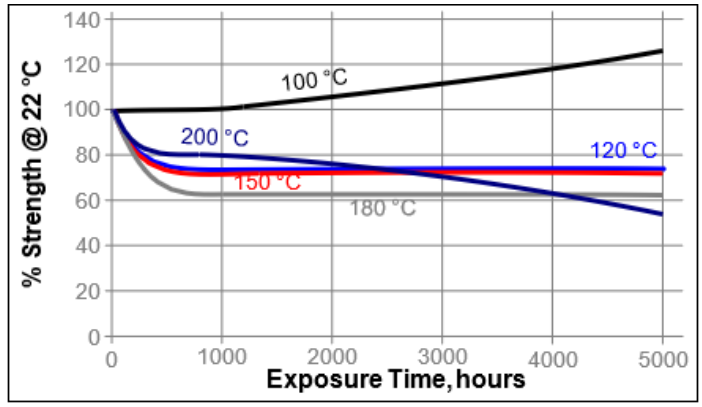
After 24 hours @25°C		
Breakloose torque, ISO 10964, pre-torqued to 5 N·m: 3/8 x 16 steel nuts and bolts	N·m (lb·in)	≥6[LMS] (≥53)
Lubricity, K-Factor:		
3/8 x 16 zinc plated steel nuts and bolts		0.15
5/8 x 11 zinc plated steel nuts and bolts		0.14
7/8 x 9 zinc plated steel nuts and bolts		0.13
After 72 hours @22°C		
Breakaway torque, ISO 10964: 3/8 x 16 steel nuts and bolts	N·m (lb·in)	43 (375)
Prevail Torque, ISO 10964: 3/8 x 16 steel nuts and bolts	N·m (lb·in)	9 (80)
Breakloose torque, ISO 10964, pre-torqued to 5 N·m: 3/8 x 16 steel nuts and bolts	N·m (lb·in)	35 (310)
Prevail Torque, ISO 10964, Pre-torqued to 5 N·m: 3/8 x 16 steel nuts and bolts	N·m (lb·in)	7 (310)
Compressive shear strength, ISO 10123: Steel pins and collars	N/mm^2 (psi)	24.5 (3,550)

TYPICAL ENVIRONMENTAL RESISTANCE
Cured for 1 week @ 22 °C
Breakloose torque, ISO 10964, Pre-torqued to 5 N·m:
M10 zinc phosphate 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	125	106	144	144
Unleaded gasoline	22	107	107	107
Brake fluid	22	100	100	129
Water/ethylene glycol 50/50	87	134	134	134
Acetone	22	100	100	100
Ethanol	22	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 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 Activator 7471™ or 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 to the lower third of the internal threads in the blind hole, or the bottom of the blind 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 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.
8. Assemble and tighten as required.

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.

For Disassembly

1. Remove with standard hand tools.
2. Where hand tools do not work because of excessive engagement length or large diameters (over 1"), apply localized heat to approximately 250°C. Disassemble while hot.

Loctite material specification[LMS]

LMS dated December 20, 2007. 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.

Product Specification

The technical data contained herein are intended as reference only and are not considered specifications for the product. Product specifications are located on the Certificate of Analysis or please contact Henkel representative.

Approval and Certificate

Please contact a Henkel representative for related approval or certificate of this product.

Data ranges

The data contained herein may be reported as a typical value. Values are based on actual test data and are verified on a periodic basis.

Temperature/Humidity Ranges: 23°C / 50% RH = 23±2°C / 50±5% RH

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

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