

LOCTITE® 241

December 2003

PRODUCT DESCRIPTION

LOCTITE® 241 provides the following product characteristics:

Technology	Acrylic
Chemical Type	Methacrylate ester
Appearance (uncured)	Blue opaque liquid ^{LMS}
Fluorescence	Positive under UV light ^{LMS}
Components	One component - requires no mixing
Cure	Anaerobic
Secondary Cure	Activator
Application	Threadlocking
Strength	Medium

LOCTITE® 241 is designed for the locking and sealing of threaded fasteners which require normal disassembly with standard hand tools. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Particularly suitable for applications on less active substrates such as stainless steel and plated surfaces, where disassembly with hand tools is required for servicing.

Mil-S-46163A

LOCTITE® 241 is tested to the lot requirements of Military Specification Mil-S-46163A. **Note:** This is a regional approval. Please contact your local Technical Service Center for more information and clarification.

ASTM D5363

Each lot of adhesive produced in North America is tested to the general requirements defined in paragraphs 5.1.1 and 5.1.2 and to the Detail Requirements defined in section 5.2.

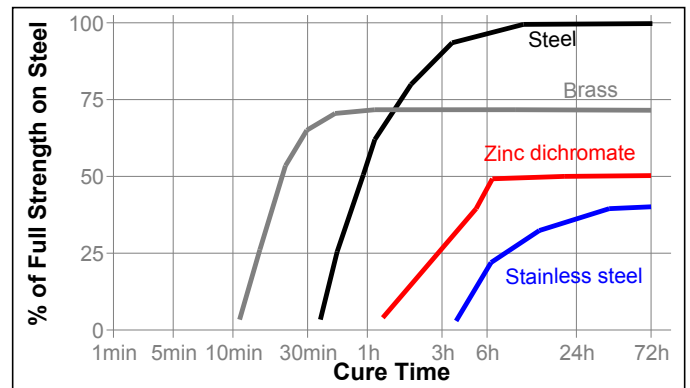
TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.06
Flash Point - See SDS	>93
Viscosity @ 25°C, mPa·s (cP):	
Cannon Fenske:	
Cannon Fenske #300	110 to 150 ^{LMS}

TYPICAL CURING PERFORMANCE

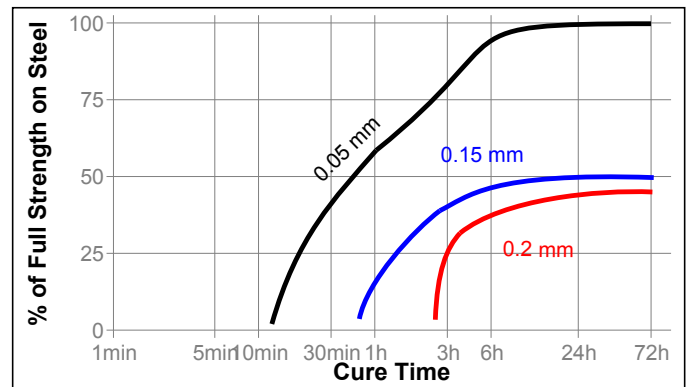
Cure Speed vs. Substrate

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.



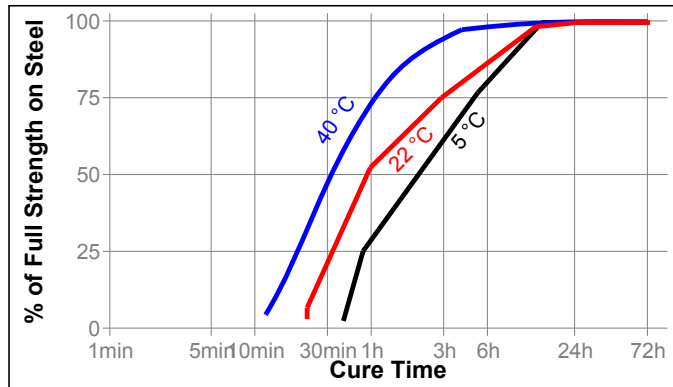
Cure Speed vs. Bond Gap

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.

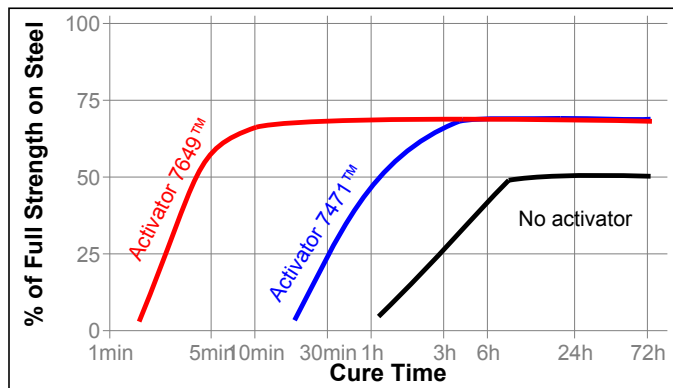


Cure Speed vs. Temperature

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 7471™ and 7649™ and tested according to MIL-S-46163.

**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 ⁻¹ K ⁻¹	0.3

TYPICAL PERFORMANCE OF CURED MATERIAL

After 24 hours @ 22°C

Adhesive Properties:

Breakaway Torque, MIL-S-46163, N·m:	
M10 steel nuts and bolts	11.5
Prevail Torque:	
MIL-S-46163, N·m:	
M10 steel nuts and bolts	10
N·m:	
3/8 x 16 steel GR 2 nuts & GR 5 bolts	5.6 to 16.9 ^{LMS}
3/8 x 16 cadmium nuts & bolts	2.3 to 22.6 ^{LMS}
3/8 x 16 zinc nuts & bolts	2.3 to 22.6 ^{LMS}
Break Torque, N·m:	
3/8 x 16 steel GR 2 nuts & GR 5 bolts	11.3 to 22.6 ^{LMS}
3/8 x 16 cadmium nuts & bolts	3.4 to 22.6 ^{LMS}
3/8 x 16 zinc nuts & bolts	3.4 to 22.6 ^{LMS}
Static Shear Strength, MIL-R-46082, Mpa:	
Steel pins and collars	10

After 90 minutes @ 22°C

Adhesive Properties:

Break Torque, N·m:	
3/8 x 16 steel GR 2 nuts & GR 5 bolts	5.6 to 22.6 ^{LMS}
Prevail Torque, N·m:	
3/8 x 16 steel GR 2 nuts & GR 5 bolts	2.8 to 16.9 ^{LMS}

TYPICAL ENVIRONMENTAL RESISTANCE

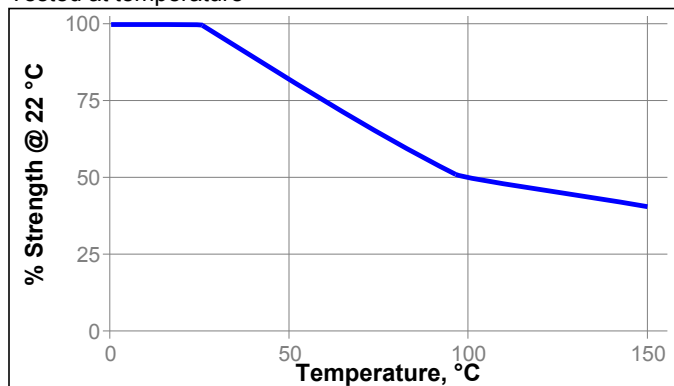
Cured 1 week @ 22°C.

Adhesive Properties:

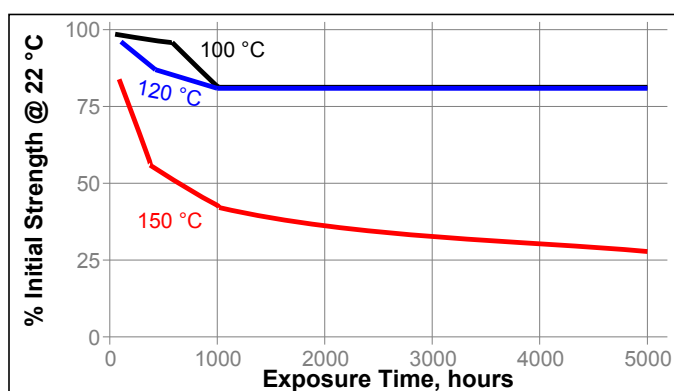
Break Torque, DIN 54454, N·m:	
M10 zinc phosphate steel nuts & bolts	

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.

Environment	°C	% of initial strength		
		100 h	500 h	1000 h
Motor oil (MIL-L-46152)	125	95	90	90
Unleaded gasoline	22	95	90	90
Ethanol	22	100	100	95
Brake fluid	22	95	95	95
1,1,1 Trichloroethane	22	100	100	100
Water/glycol 50/50	87	85	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 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 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.
7. 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.

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 December 13, 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 Technical Service Center or Customer Service Representative.

Conversions

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$
 $\text{kV/mm} \times 25.4 = \text{V/mil}$
 $\text{mm} / 25.4 = \text{inches}$
 $\mu\text{m} / 25.4 = \text{mil}$
 $\text{N} \times 0.225 = \text{lb}$
 $\text{N/mm} \times 5.71 = \text{lb/in}$
 $\text{N/mm}^2 \times 145 = \text{psi}$
 $\text{MPa} \times 145 = \text{psi}$
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$
 $\text{mPa}\cdot\text{s} = \text{cP}$

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Reference 0.1

Note:

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