



LOCTITE[®] 294

May 2004

PRODUCT DESCRIPTION

LOCTITE[®] 294 provides the following product characteristics:

Technology	Acrylic
Chemical Type	Dimethacrylate Ester
Appearance (uncured)	Dark Green liquid ^{LMS}
Fluorescence	Positive under UV light ^{LMS}
Components	One component - requires no mixing
Viscosity	Low
Cure	Anaerobic
Secondary Cure	Activator
Application	Threadlocking
Strength	Medium to High

LOCTITE[®] 294 is designed for the locking and sealing of threaded fasteners. Because of its low viscosity and capillary action, the product wicks between engaged threads and eliminates the need to disassemble prior to application. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. The product also provides good threadlocker performance with oil coated fasteners.

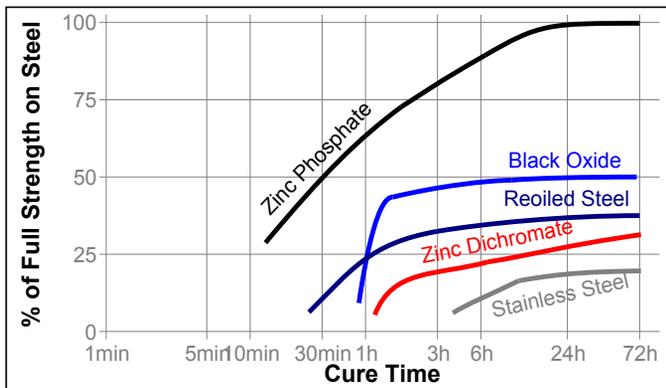
TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.13
Flash Point - See MSDS	
Viscosity, Brookfield - LVF, 25 °C, mPa·s (cP):	
Spindle 2, speed 50 rpm	20 to 45 ^{LMS}

TYPICAL CURING PERFORMANCE

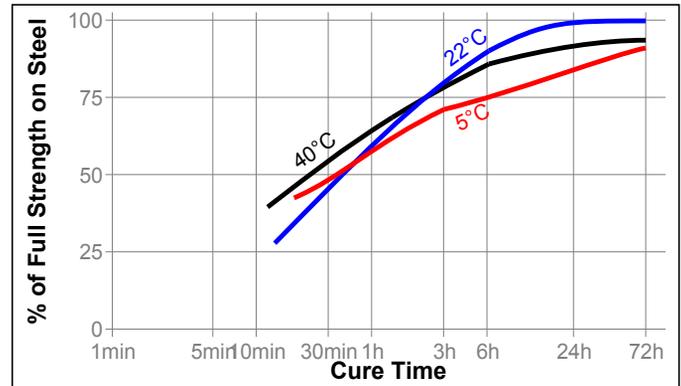
Cure Speed vs. Substrate

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



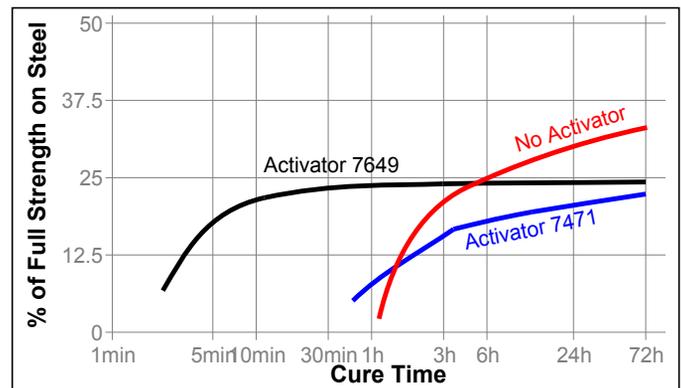
Cure Speed vs. Temperature

The rate of cure will depend on the temperature. The graph below shows the breakaway strength developed with time at different temperatures on M10 Zinc Phosphate 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 breakaway strength developed with time using Activator 7471 and 7649 on M10 zinc dichromate steel nuts and bolts and tested according to ISO 10964.



TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties:

Coefficient of Thermal Conductivity, ASTM C 177, W/(m·K)	0.173
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TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

After 24 hours @ 22 °C

Breakaway Torque, ISO 10964:

M10 zinc phosphate steel nuts and bolts	N·m	33
	(lb.in.)	(290)
3/8 x 16 steel nuts (grade 2) and bolts (grade 5)	N·m	≥13 ^{LMS}
	(lb.in.)	(115)

Prevail Torque, ISO 10964:

M10 zinc phosphate steel nuts and bolts	N·m	27
	(lb.in.)	(240)
3/8 x 16 steel nuts (grade 2) and bolts (grade 5)	N·m	≥15 ^{LMS}
	(lb.in.)	(130)

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

M10 zinc phosphate steel nuts and bolts	N·m (lb.in.)	38 (340)
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Max. Prevail Torque, ISO 10964, Pre-torqued to 5 N·m:

M10 zinc phosphate steel nuts and bolts	N·m (lb.in.)	35 (310)
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After 2 hours @ 22 °C

Breakaway Torque, ISO 10964:

3/8 x 16 steel nuts (grade 2) and bolts (grade 5)	N·m (lb.in.)	≥2.50 ^{LMS} (20)
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Prevail Torque, ISO 10964:

3/8 x 16 steel nuts (grade 2) and bolts (grade 5)	N·m (lb.in.)	≥1 ^{LMS} (9)
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After 72 hours @ 260 °C, tested @ 22 °C

Breakaway Torque, ISO 10964:

3/8 x 16 steel nuts (grade 2) and bolts (grade 5)	N·m (lb.in.)	≥6 ^{LMS} (50)
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Prevail Torque, ISO 10964:

3/8 x 16 steel nuts (grade 2) and bolts (grade 5)	N·m (lb.in.)	≥7.50 ^{LMS} (65)
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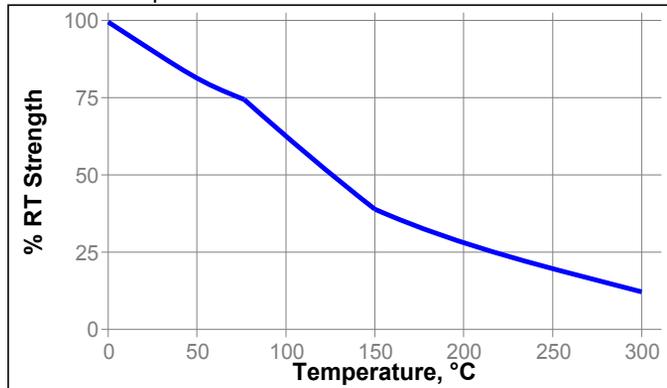
TYPICAL ENVIRONMENTAL RESISTANCE

Cured for 72 hours @ 22 °C

Breakloose Torque, ISO 10964, Pre-torqued to 5 N·m:
M10 zinc phosphate steel nuts and bolts

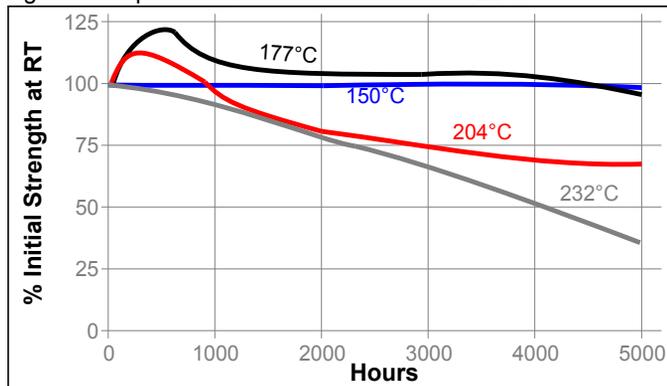
Hot Strength

Tested at temperature



Heat Aging

Aged at temperature indicated and tested at 22 °C



Chemical/Solvent Resistance

Aged under conditions indicated and tested at 22 °C.

Environment	°C	% of initial strength			
		100 hr	500 hr	1000 hr	5000 hr
Motor Oil	125	80	64	63	46
Unleaded Gasoline	22	100	100	100	100
Brake fluid	22	100	100	100	96
Water Glycol 50/50	87	80	72	64	56
Acetone	22	98	100	97	93
Ethanol	22	100	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 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 Pre-assembled Threaded Parts with Thru Holes

1. Prior to assembly, clean all threads (bolt and hole) with a Loctite cleaning solvent and allow to dry.
2. **For Thru Holes**, apply several drops of product at screw and body juncture.
3. Avoid touching the bottle tip to the metal surface.
4. This product is not recommended for pre-assembled threads in a blind hole.

For Porosity Sealing

1. Clean area and apply localized heat to the area to approximately 121 °C.
2. Allow to cool to approximately 85 °C and apply to the product.

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 September 25, 1997. 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 Loctite 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

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$

$\text{kV/mm} \times 25.4 = \text{V/mil}$

$\text{mm} / 25.4 = \text{inches}$

$\text{N} \times 0.225 = \text{lb}$

$\text{N/mm} \times 5.71 = \text{lb/in}$

$\text{N/mm}^2 \times 145 = \text{psi}$

$\text{MPa} \times 145 = \text{psi}$

$\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$

$\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$

$\text{mPa}\cdot\text{s} = \text{cP}$

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, **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

LOCTITE is a trademark of Henkel Corporation

Reference 1