LOCTITE®

Product 640

September 2003

PRODUCT DESCRIPTION

LOCTITE® 640 High Temperature Retaining Compound provides the following product characteristics:

Technology	Acrylic
Chemical Type	Methacrylate Ester
Appearance (uncured)	Green liquid[LMS]
Fluorescence	Positive under UV light[LMS]
Components	One component - requires no mixing
Viscosity	Medium
Cure	Anaerobic
Secondary Cure	Activator
Application	Retaining
Strength	High
Operating Temperature	-54°C to +232°C

Product 640 is designed for the bonding of cylindrical fitting parts. The product cures when confined in the absense of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include filling inner voids in close fitting press fits, keyways, and splines; mounting bearings and bushings, and making press fits even stronger.

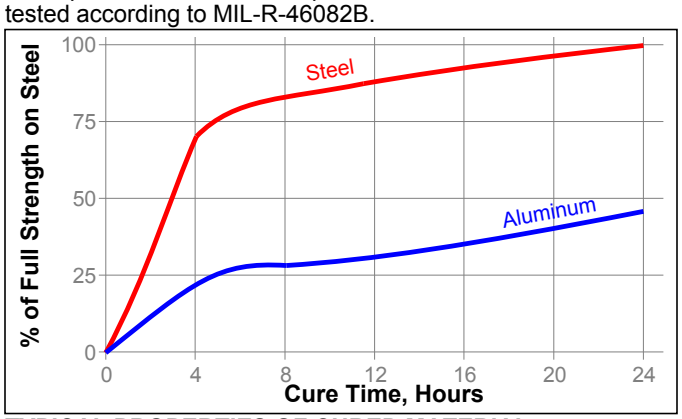
TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25°C	1.20
Flash Point (TCC), °C	>93
Viscosity @ 25°C, mPa·s:	
Cannon Fenske:	
Cannon Fenske #400, ASTM D445	450 to 750[LMS]

TYPICAL CURING PERFORMANCE

Cure Speed vs. Substrate

The rate of cure will depend on substrate used. The graph below shows the breakaway strength developed with time on steel pins and collars compared to different materials and tested according to MIL-R-46082B.



TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties:

Coefficient of Thermal Expansion, ASTM D 696, /K^{-1}	0.10
Coefficient of Thermal Conductivity, ASTM C177, W.m^{-1} K^{-1}	0.10
Specific Heat, kJ.kg^{-1} K^{-1}	0.30
Elongation, at break, ASTM D 412, %	<2

PERFORMANCE OF CURED MATERIAL

After 24 hours @ 22°C

Adhesive Properties:

Shear Strength:	
DIN 54452, N/mm² :	
Steel pins and collars	22
MIL-R-46082B, N/mm² :	
Steel pins and collars	20.70

After 30 minutes @ 22°C

Adhesive Properties:

Compressive Shear, N/mm² :	
Steel pins and collars	≥11.00[LMS]

Heat Cured for 1 hour @ 93°C, tested at 22°C.

Adhesive Properties:

Compressive Shear, N/mm² :	
Steel pins and collars	≥22.70[LMS]

TYPICAL ENVIRONMENTAL RESISTANCE

Cured 1 week @ 22°C.

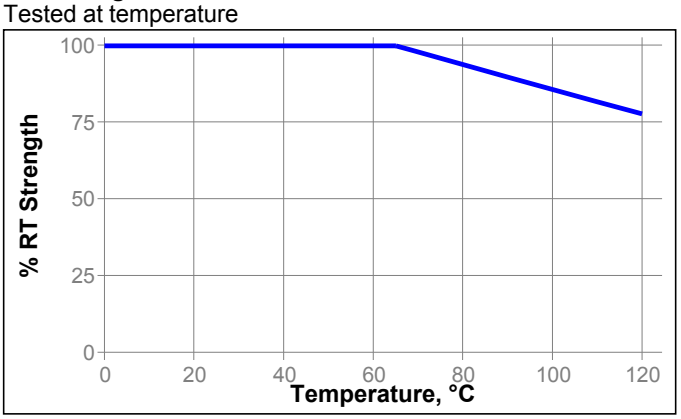
Adhesive Properties:

Shear Strength, ISO 10123, N.m:

Steel pins and collars

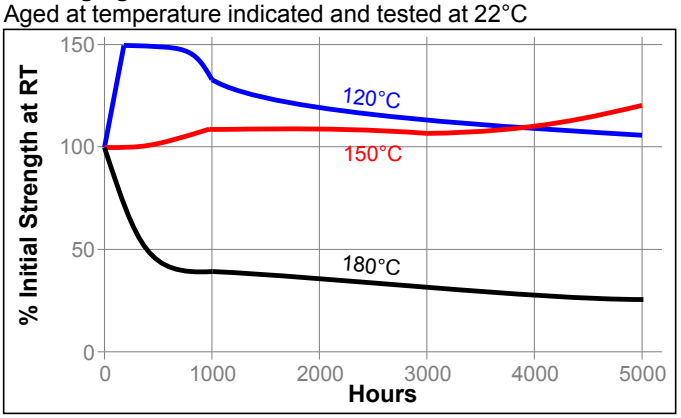
Hot Strength

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.

		% of initial strength		
Environment	**°C**	**100 hr**	**500 hr**	**1000 hr**
Motor Oil	125	100	100	100
Unleaded Gasoline	22	100	100	100
Leaded Gasoline I	22	100	100	100
Brake fluid	22	100	100	100
Water Glycol 50/50	87	100	90	75
Ethanol	22	100	100	100
Acetone	22	100	100	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 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 the 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
Determine if the substrates to be bonded are made from an *active* or an *inactive* material. Product 640 will react faster with *active* metals. While *inactive* metals will require the use of an Activator to obtain maximum strength and cure speed at room temperature. If the metal is unknown, we recommend to use Activator 7471.

Active Metals	**Inactive Metals**
	Stainless Steel
	Nickel
Steel	Zinc
Copper	Cadmium
Brass	Pure Aluminum
Bronze	Bright Platings
	Anodized Surface
	Titanium

For Assembly

1. For best results, clean all surfaces (external and internal) with a cleaning solvent such as Loctite ODC Free Cleaner & Degreaser and allow to dry.
2. **For Slip Fitted Assemblies**, apply adhesive around the pin and the leading edge of the collar and use a rotating motion during assembly to ensure good coverage.
3. **For Press Fitted Assemblies**, apply adhesive thoroughly to both bond surfaces and assemble at high press on rates.
4. **For Shrink Fitted Assemblies** the adhesive should be coated onto the pin, the collar should then be heated to create sufficient clearance for free assembly.
5. Parts should not be disturbed until sufficient handling strength is achieved.

For Disassembly

1. Apply localized heat to the assembly to approximately 232°C. Disassemble while hot.

For Cleanup

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

Loctite Material Specification[LMS]
LMS dated February 15, 1996. 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.
Products shall be maintained at temperatures between 8°C to 28°C unless otherwise labeled, or, specified. Storage, at temperatures below 8°C, or, greater than 28°C, is not recommended. Temperatures below 8°C and above 28°C can adversely affect product properties
Material removed from containers may be contaminated during use. Do not return product to the original container. Loctite 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 x 0.039 = inches
mPas = cP
N/mm^2 x 145 = psi
N x 0.225 = lbs

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 Loctite 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 Loctite Corporation's products. Henkel Loctite 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 Loctite 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.

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Reference 0.1