

PERMABOND[®] LM113

**Low Strength, Medium Viscosity
Anaerobic Threadlocker**



TYPICAL APPLICATIONS

General Maintenance and Assembly

Locks and Seals Fine Threaded Nuts and Bolts
Post Application Threadlocking
Replaces Lockwashers

Typical Industries Served

Furniture Construction
Automotive Electronics
Appliances Hydraulic Machinery

FEATURES & BENEFITS

- ◆ Full Cure at Room Temperature
- ◆ Easy to Use & Apply
- ◆ Environmentally Friendly – 100% Solids
- ◆ Excellent Chemical Resistance
- ◆ Resistance to Vibration Loosening
- ◆ Controlled Off-Torque
- ◆ Superior Environmental Resistance

GENERAL DESCRIPTION

PERMABOND's LM113 Threadlocker is a medium viscosity product for locking small threaded fasteners, such as screws and bolts or hydraulic fittings that might require disassembly. Due to its thixotropic viscosity, the liquid viscosity will not run away from the area of application. PERMABOND's LM113 Threadlocker cures reliably and fast on steel, cadmium, zinc and other plated fasteners.

PHYSICAL PROPERTIES OF THE UNCURED ADHESIVE

<u>Properties</u>	
Base Resin	Methacrylate Esters
Solids, %	100
Color	Purple
Viscosity, cP, 25°C (77°F)	1200
Consistency	Liquid
Gap Filling, in	0.006
Specific Gravity	1.09
Flash Point, °C (°F)	>110 (230)
Shelf Life stored at or below 27°C (80°F), months*	12

*Package sizes greater than one liter, six months.

Non-Warranty: The information given and the recommendations made herein are based on our research and are believed to be accurate but no guarantee of their accuracy is made. In every case we urge and recommend that purchasers before using any product in full-scale production make their own tests to determine to their own satisfaction whether the product is of acceptable quality and is suitable for their particular purpose under their own operating conditions. THE PRODUCTS DISCLOSED HEREIN ARE SOLD WITHOUT ANY WARRANTY AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED.

No representative of ours has any authority to waive or change the foregoing provisions but, subject to such provisions, our engineers are available to assist purchasers in adapting our products to their needs and to the circumstances prevailing in their business. Nothing contained herein shall be construed to imply the non-existence of any relevant patents or to constitute a permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of this patent. We also expect purchasers to use our products in accordance with the guiding principles of the Chemical Manufacturers Association's Responsible Care[®] program.

PERMABOND

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SPEED OF CURE

Speed of Cure*	
Fixture Strength, minutes	15
Full Strength, hours	24

*Measured on clean M10 steel nuts & bolts.

BEHAVIOR ON DIFFERENT SUBSTRATES

PERMABOND's LM113 Threadlocker performs best on clean steel but will perform satisfactorily on most metals including anodized aluminum, stainless steel, brass, oily and "as received" finishes, and plated fasteners. When used on "inactive and passive" materials, speed of cure is slowed and ultimate strength may be reduced. Generally, fixturing strength is achieved in approximately 15 minutes on active metals and 30 minutes on passive metals. Cure speed and strength may be accelerated by heat (up to 121°C [250°F]). Conversely, when temperatures during cure are below 21°C (70°F), speed of cure will be reduced. Use of **PERMABOND's ASC10** Surface Conditioner will accelerate cure rates, but may affect ultimate strength with up to a 25% strength reduction. **PERMABOND's ASC10** Surface Conditioner may also be used for inducing cure on non-metals.

Activity of Materials and Finishes

Super Active	Active	Inactive	Passive
Brass Copper Magnesium	Iron Steel Nickel Aluminum	Anodized aluminum Cadmium finishes Chrome finishes Passivated metals Stainless steel Titanium Zinc	Ceramics Glass Plastics Painted finishes
Super Active	Very fast cure		
Active	Fast cure		
Inactive	Slow cure		
Passive	No cure without PERMABOND's ASC10 Surface Conditioner		

PERFORMANCE PROPERTIES OF THE CURED ADHESIVE

Cured at 25°C for 24 hours	
Torque, ISO 10964	
Breakaway, lb-in (N·m)	
M10 steel nuts and bolts	80 (9)
Prevail, lb-in (N·m)	
M10 steel nuts and bolts	40 (5)
Compressive shear strength, ISO 10123 (Steel pin and collars)	750 psi 5 N/mm ²

ELECTRICAL PROPERTIES

Dielectric Strength, MV/m 11
Electrical Resistance, Ωm 10^{17}

THERMAL PROPERTIES

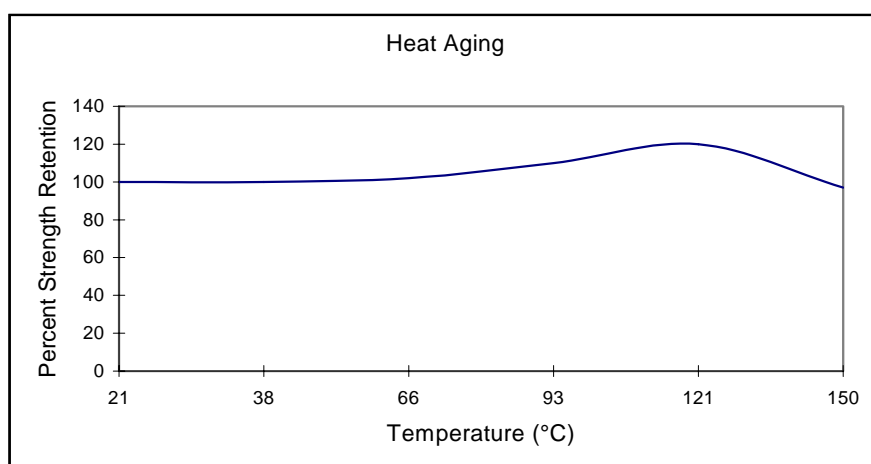
Thermal Conductivity, W/mK 0.19
Thermal Expansion Coefficient, in/in/ $^{\circ}\text{C}$ 90×10^{-6}

HEAT RESISTANCE

PERMABOND's LM113 Threadlocker cures to a crosslinked, thermoset plastic with excellent resistance to environmental conditions and high temperatures. The maximum temperature recommended for use is 150C (300°F).

HEAT AGING

The strength retention of **PERMABOND's LM113** Threadlocker measured at room temperature after 1000 hours aging at elevated temperatures is shown:



CHEMICAL RESISTANCE

When fully cured and crosslinked, **PERMABOND's LM113** Threadlocker resists most chemicals, even at elevated temperatures. Chemical washes of any kind will have no effect on the adhesive as they are of short duration. **PERMABOND's LM113** Threadlocker is not recommended for use in the severe environment of pure oxygen, or extremely strong acids and alkalis.

340 Hour Immersion	Temperature, $^{\circ}\text{C}$ ($^{\circ}\text{F}$)	Full Strength Retained, %
Water	75 (168)	100
Butyl alcohol	75 (168)	100
Toluene	75 (168)	99
Motor oil	75 (168)	99
Hydrocarbon test fluid	75 (168)	100
JP4-jet fuel	75 (168)	93
JP5-jet fuel	75 (168)	100
Ethylene glycol	75 (168)	99

*For additional chemicals, consult the PERMABOND Bulletin: "PERMABOND Anaerobic Adhesives and Sealants Chemical Compatibility List"

VIBRATION RESISTANCE

The primary use of **PERMABOND's LM113** Threadlocker is to prevent loosening of fasteners under vibration, in addition to providing a controlled off-torque. PERMABOND's LM113 Threadlocker exceeds the performance of lockwashers, springwashers, nylon patches, and other mechanical vibration resistant locking systems.

APPLICATION & DISPENSING

1. For best results, clean all surfaces with a cleaning solvent and allow to dry.
2. If the substrates being used are inactive metals or the cure speed is too slow, then spray the parts with Permabond ASC10 and allow to dry.
3. Prevent the tip from touching metal surfaces during application.
4. When working with thru holes, dispense a bead of material across the contact length of the treads.
5. When working with blind holes, apply several drops down the threads to the bottom of the hole.
6. Assemble and torque the parts as necessary.

PERMABOND LM113 Threadlocker may be readily dispensed from the bottle directly onto the parts. However, application via automated dispensing equipment is feasible.

STORAGE & HANDLING:

PERMABOND's LM113 Threadlocker should be stored in the original unopened container in a cool place away from sparks, flame, excessive heat and sunlight. Handling should be done using plastic gloves and proper eye protection. Skin contact should be avoided. If skin contact occurs, the affected area should be washed thoroughly with soap and water. Eye contact should be treated by thorough washing with water followed by medical attention. Adequate ventilation is necessary to prevent inhalation of vapors. Proper Personal Protective Equipment is always recommended when using chemicals. **For more information, consult the Material Safety Data Sheet.**

PERMABOND's LM113 Threadlocker has a shelf life of one year from date of shipment from Permabond when stored at or below 27°C (80°F). Do not freeze. Product removed from original container might be contaminated during use. Do not return this material to the original container.

FOR INDUSTRIAL USE ONLY. KEEP OUT OF REACH OF CHILDREN.