

# PERMABOND<sup>®</sup> MM115 PURE<sup>™</sup>

**Permabond**<sup>®</sup>  
Engineering Adhesives

**NSF 61 Approved**  
**Anaerobic Retaining Compound**

Ref. #: 052808PBMM115P

## FEATURES & BENEFITS

- NSF certified drinking water system component
- Simple one part system
- Resistance to vibration loosening of fasteners
- Superior environmental resistance
- Ease of use

## GENERAL DESCRIPTION

**PERMABOND MM115 PURE** Anaerobic Adhesive/Sealant is a single component liquid that cures only when in contact with metal parts and oxygen is excluded. Anaerobic adhesives are not truly "adhesives" as they work not by "sticking" parts together, but by filling the gap between mated parts and curing to a hard plastic, locking the assembly in place. Thus no relative movement between the parts is possible, and the potential loosening due to vibration is prevented. In addition to threadlocking, anaerobic adhesives can also be used as sealants as they fill (100%) and seal the gap between mated parts. **PERMABOND MM115 PURE** Threadlocking Adhesive/Sealant cures to a tough, cross-linked plastic that has excellent environmental and temperature resistance.

**PERMABOND MM115 PURE** Anaerobic Threadlocking Adhesive/Sealant conforms to all applicable requirements of the ANSI/NSF Standard 61, Drinking Water System Components - Health Effects, as certified by the National Sanitation Foundation and the American National Standards Institute. Standard 61 was developed in conjunction with regulatory agencies, industry, water suppliers, consultants, and other users of the products covered in the standard. Standard 61 establishes requirements for the control of potential adverse human health effects from products added to water indirectly via contact with treatment, storage, transmission, and distribution system components. The NSF standards are widely recognized by public health officials, and certified products have been tested and determined to cause no adverse health effects.

**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<sup>®</sup> program.

## PERMABOND

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**PHYSICAL PROPERTIES OF THE UNCURED ADHESIVE/SEALANT**

<u>Properties</u>	<u>MM115 PURE</u>
Base Resin	Methylacrylates
Solids, %	100
Color	Colorless to light amber
Mean Viscosity, cp* at 25°C (77°F)	1300
Specific Gravity	1.09
Flash Point °C (°F)	110 (230)
Gel Time, minutes	30-60
Shelf Life stored at or below 27°C (80°F), months**	12
Maximum Gap Filling, inches	0.006

\*MM115 is thixotropic, i.e., easy to dispense, but undergoes no migration when the adhesive is on the parts

\*\*Package sizes greater than one liter, six months.

**SPEED OF CURE**

Typical Fixturing Time	10 minutes
Full Strength	24 hours

**BEHAVIOR ON DIFFERENT METALS**

**PERMABOND MM115 PURE** Threadlocking Compounds perform best on steel, but will perform well on most metals, including aluminum, stainless steel, brass, and plated fasteners. They will also perform well on oily parts, but for optimum results the parts should be cleaned before hand. When used on passive materials, speed of cure is slowed somewhat and ultimate strength may also be reduced. Generally, metals that induce a "fast cure" will achieve fixturing strength in about 10 minutes, while less active metals that induce a "slow cure" will take about 20 minutes to fixture.

**ACTIVITY OF MATERIALS AND FINISHES**

Super Active	Active	Inactive	Passive
Brass Copper Magnesium	Iron Steel Aluminum Nickel	Anodized aluminum Cadmium finishes Chrome finishes Passivated metals Stainless steel Titanium Zinc	Ceramics Glass Plastics Paint Finishes

**EFFECT OF TEMPERATURE ON CURE SPEED**

**PERMABOND MM115 PURE** products are designed to cure at room temperature but can be accelerated by heat if a faster cure is needed. Heating the liquid sealant above 120°C (248°F) is not recommended [once cured, it has an upper temperature limit of 150°C (300°F)]. For every 10°C rise in temperature, the rate of cure will double. Conversely, for every 10°C drop in temperature, the rate of cure is reduced by a factor of two.

**PERFORMANCE PROPERTIES OF THE CURED ADHESIVE/SEALANT**

Cured at 25°C for 24 hours	
Torque, ISO 10964	
Breakaway, lb-in (N·m)	
M10 steel nuts and bolts	140 (16)
Prevail, lb-in (N·m)	
M10 steel nuts and bolts	60 (7)
Compressive shear strength, SO 10123 (Steel pin and collars)	1500 psi (10) N/mm <sup>2</sup>

**ELECTRICAL & THERMAL PROPERTIES**

Dielectric Strength, MV/m	>11.0
Electrical Resistance, ohm	10 <sup>17</sup>
Thermal Conductivity, W/m <sup>°K</sup>	0.19
Thermal Expansion Coefficient, in/in <sup>°C</sup>	90x10 <sup>-6</sup>
Operating Temperature, °C (°F)	200 (392)

**HEAT RESISTANCE**

Since **PERMABOND MM115 PURE** products cure to a crosslinked, thermoset plastic, they exhibit excellent environmental and heat resistance. However, they are organic materials, so the extreme upper limit is approximately 150°C (300°F). Low temperatures do not markedly affect strength.

**CHEMICAL RESISTANCE**

The fully cured and crosslinked threadlocking adhesive/sealants resist most chemicals well, even at elevated temperatures. Chemical washes of any kind will have no effect on the adhesives because of the generally short duration of exposure. Anaerobic products are not recommended for use in the severe environment of pure oxygen or strong acids or alkalis.

## VIBRATION RESISTANCE

**PERMABOND MM115 PURE** prevents loosening of mated parts under vibration. In fact, it performs significantly better than lockwashers, springwashers, nylon patch (prevailing torque screws), and other so-called vibration resistant locking systems. The following table shows an accelerated vibration test done with a transverse vibration tester. It shows that lockwashers actually aid the loosening of the fastener under conditions of vibration. Nylon patches and other prevailing torque systems may provide some resistance, but only anaerobic adhesive/sealants provide complete resistance to vibration. This is because only anaerobic compounds fill the gaps between mated parts and thus no movement of the parts is possible. Therefore, the assembly will not loosen due to vibration.

Clamping Load Retained Under Vibration - Clamping Force Retained

	<u>10 seconds</u>	<u>20 seconds</u>	<u>40 seconds</u>
Plain Nut	66%	40%	10%
Split Washer	40%	10%	<5%
Anaerobic Sealant*	95%	95%	95%

\*The initial loss in bolt tension is caused by the relaxation of the metal parts.

## EFFECT OF LUBRICITY

**PERMABOND MM115 PURE** is specifically designed to provide a lubricity similar to "as received" fasteners so that standard torque tension tables can be used. Other non-lubricated anaerobic products generally will result in a frictional factor of approximately 20-25% on "as received" fasteners.

## MATERIAL COVERAGE

**PERMABOND MM115 PURE** Anaerobic Threadlockers are an inexpensive way of locking parts against vibration. They need only be applied in amounts sufficient to fill the inner air space between male and female parts. Any excess of product provides no additional locking action.

## 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 threads.
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 MM115 PURE** can be readily dispensed directly out of the bottle onto the parts. The products are also suitable for application through automated dispensing equipment.

## **STORAGE & HANDLING**

**Permabond MM115Pure** 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 MM115 Pure** Threadlocker has a shelf life of one year 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.

## **UNCURED (LIQUID) ANAEROBIC ADHESIVE/SEALANTS**

Uncured anaerobic compounds contain reactive chemicals. These chemicals can cause skin irritation on individuals with sensitive skin. Good housekeeping to keep work areas and tools clean, is usually sufficient to prevent skin irritation. Barrier creams and plastic gloves should be used to ensure worker protection against accidental or chronic exposure.

Atomizing the liquid compound into the air can allow it to be inhaled and thereby expose the lungs to the contact irritation possible on the skin. Spray applications are not recommended.

## **CURED (SOLID) ANAEROBIC ADHESIVE/SEALANT**

The cured product is a hard inert plastic that is safe to handle. The curing reaction reacts all of the liquid adhesive (100%) into the solid plastic. No solvents or other substances are released upon cure as is the case with many other adhesives. Once cured, **PERMABOND MM115 PURE** has been determined to cause no adverse health effects and is a **NSF certified drinking water** system component.

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