PERMABOND® HM165

High Strength, High Temperature Resistant
Anaerobic Retaining Compound

Ref. #: 030308PBHM165

TYPICAL APPLICATIONS

General Maintenance
Retaining keys and bearings
Reduces the need for highly machined surfaces

Typical Industries Served
Automotive
Appliances
Equipment

General Assembly
Reduces the cost required for highly finished surfaces
Seals against corrosion between two closely fitting parts
Eliminates the need to heat assemblies for press fits

FEATURES & BENEFITS

- High temperature resistant
- Reduces cost by allowing the use of lighter press fits
- Speeds production by utilizing easier to assemble tolerances
- Prolongs bearing life by reducing the stress on bearings caused by press fits
- Improves alignment by filling space between bearing rings and housings
- Excellent gap filling capability
- Keeps machinery on line by dressing worn parts
- Strengthens the joint by augmenting the press fit used to assure concentricity of the shafts and bearings
- Prevents corrosion between mated parts by excluding air and moisture from the joint
- Prevents loosening caused by vibration and thermal expansion

GENERAL DESCRIPTION

PERMABOND® HM165 is a high viscosity retaining compound that cures when confined between metal parts to form a tough, hard plastic. It is best suited for cylindrical parts and where high temperature resistance is required. The high viscosity and thixotropic effect of the material allows for larger tolerances. In the uncured, liquid state, the adhesive wets the metal surfaces, keying into all surface irregularities and fills the space between the mated parts.

PERMABOND
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Once cured, the anaerobic adhesive fills the space between the parts preventing loosening from vibration or thermal expansion. When cured, **HM165** seals the joint against attack by harsh environments.

PHYSICAL PROPERTIES OF THE UNCURED ADHESIVE

Properties	
Base Resin	Methacrylate
Solids, %	100
Color	Green
Fluorescence	Under Blue Light
Viscosity, cP, 25°C (77°F)	10,000
Gap Filling, mm (in)	0.30 (0.012)
Specific Gravity	1.1
Flash Point, °C (°F)	>100 (212)
Shelf Life stored at or below 25°C (77°F), months*	12

*Package sizes greater than one liter, six months.

CURING PROPERTIES

Cure Speed*	
Fixture time (min)	15
Full Cure (hours)	24

*Measured on clean M10 steel nuts & bolts.

BEHAVIOR ON DIFFERENT SUBSTRATES

PERMABOND® HM165 retaining compound 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 development 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® ASC10** Surface Conditioner will accelerate cure rates, but may affect ultimate strength with up to a 25% strength reduction. **PERMABOND® ASC10** Surface Conditioner may also be used for inducing cure on non-metals.

Activity of Materials and Finishes

Super	Active	Inactive	Passive Active
Brass Copper Magnesium	Iron Steel Nickel Aluminum	Anodized aluminum Cadmium finishes Chrome finishes Passivated metals Painted finishes Stainless steel Titanium Zinc	Ceramics Glass Plastics
Super Active Active Inactive Passive	Very fast cure Fast cure Slow cure No cure without PERMABOND® 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	250 (28)
Prevail, lb·in (N·m)	
M10 steel nuts and bolts	480 (54)
Compressive shear strength,ISO 10123 (Steel pin and collars)	3800 psi (26) N/mm^2

ELECTRICAL PROPERTIES

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

THERMAL PROPERTIES

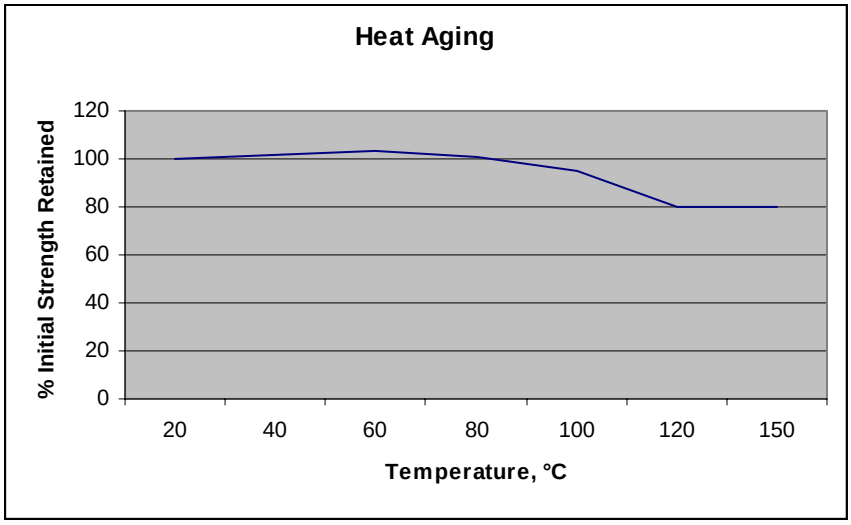
Thermal Conductivity, W/mK	0.19
Thermal Expansion Coefficient, in/in/°C	90×10^{-6}

HEAT RESISTANCE

PERMABOND® HM165 Retaining compound cures to a crosslinked, thermoset plastic with excellent resistance to environmental conditions and high temperatures. The maximum temperature recommended for use is 230°C (445°F).

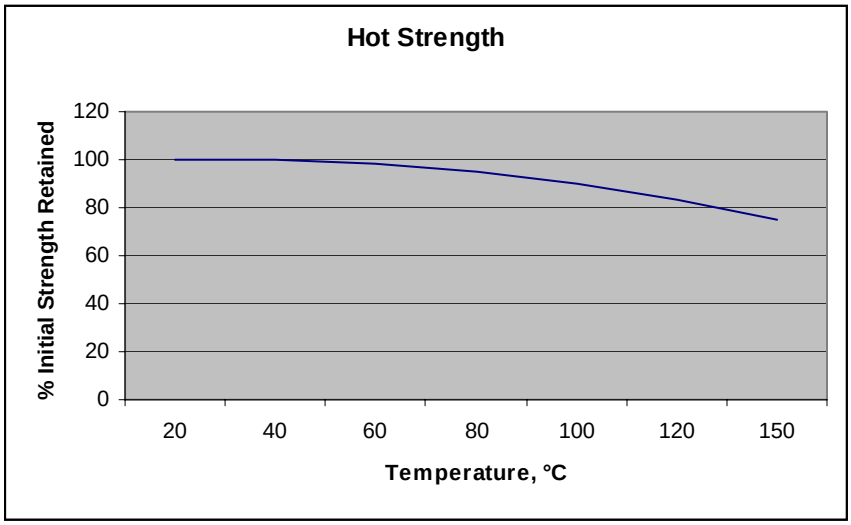
HEAT AGING

The strength retention of **PERMABOND® HM165** Retaining compound measured at room temperature after 1000 hours aging at elevated temperatures is shown:



HOT STRENGTH

The strength retention of **PERMABOND® HM165** measured at elevated temperatures following 2 hours aging is:



CHEMICAL RESISTANCE

When fully cured and crosslinked, **PERMABOND® HM165** Retaining compound 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® HM165** Retaining compound is not recommended for use in the severe environment of pure oxygen, or extremely strong acids and alkalis.

340 Hour Immersion	Temperature, °C (°F)	Initial 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® HM165** Retaining compound is to prevent loosening of fasteners under vibration, in addition to providing a controlled off-torque. **PERMABOND's HM165** Retaining compound exceeds the performance of lockwashers, springwashers, nylon patches, and other mechanical vibration-resistant locking systems.

VISCOSITY & GAP FILLING PROPERTIES

PERMABOND® HM165 Retaining compound is a high viscosity adhesive, and allows filling of larger gaps such as coarse threaded fasteners.

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. On slip fitted assemblies, apply adhesive on the leading edge of the pin and on the inside of the collar. Assemble with twisting action.
4. On press fitting assemblies, apply the adhesive on the pin and collar. Assemble using a press.
5. On shrink fitted assemblies, apply the adhesive to the pin, heat the collar to create enough clearance and assemble.
6. Allow the parts to fixture before disturbing them.

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PERMABOND® HM165 Retaining compound may be readily dispensed from the bottle directly onto the parts. However, application via automated dispensing equipment is feasible.

STORAGE & HANDLING:

PERMABOND®HM165 Material should be stored in the original 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® HM165 Retaining compound has a shelf life of one year when stored at or below 25°C (77°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.