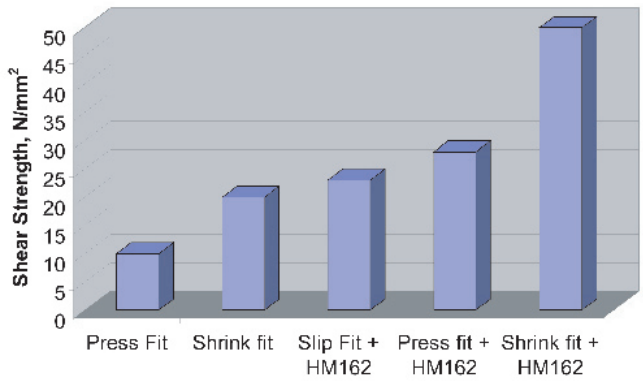
Sales Tool Anaerobic Retaining Compounds

Permabond Anaerobic Retaining Compounds are single part, room temperature curing adhesives that polymerize in the presence of metal and absence of air. They are designed for the permanent bonding of non-threaded cylindrical joints.

Method	Advantages	Limitations
Permabond Retaining Compounds	**• Eliminate need for high friction force - fast and easy assembly** **• Augment or replace press fits** **• Reduce machine costs by requiring less severe machining tolerances** **• Allows for use of different metals** **• Eliminate contact corrosion and seizure** **• Seals against corrosion** **• Very high strength allowing for high forces and torque to be easily transmitted** **• Disassembly possible with heat** **• Will not contaminate the internal system - material dissipates in the system**	• Metal needed for cure • Some plastics may stress crack when in contact with uncured anaerobics
Positive Drives – Keyway	• Easy to assemble and disassemble • Transmit very high torque	• "Notch effect" which occurs in the Key area will cause stresses on the substrate. • Uneven distribution of mass can cause vibration at high speeds
Friction Drives – Press Fits, Shrink Fits	• No imbalance at high speeds when compared to a key way • Well known	• Rely on friction alone to transmit torque so very close tolerances are needed leading to increase costs • Difficult to assembly • Difficult or impossible to disassemble because of fretting or contact corrosion
Welding and Soldering	• Strength compares to bonding	• Only homogeneous metals can be joined (difficult to weld steel to Al) • The high temperatures may distort parts • Heating and cooling could cause structural degradation of the parts • Welds can be unsightly

Strength Comparison with and without HM162



Industries to Target

Retaining compounds are widely used in machines and equipment in various industries. Following are only a few examples...

- Automobiles
- Automotive remanufacturers
- Bearing Suppliers
- Commercial
- Electronics
- Farm Equipment
- Industrial Machinery
- Marine
- Military
- Pumps
- Recreational
- Valves

Permabond's high performance anaerobic formulations provide 100% surface-to-surface contact while mechanical joining techniques provide only 20% of surface-to-surface contact. The resulting surface area increase allows for a greater load carrying capacity, more than 5 times that of mechanical joining techniques. Additionally these retaining compounds allow for relaxed machine tolerances, drastically reducing costs and increasing the life of the components. They eliminate the need for heated joining processes providing more efficient processing.

Permabond® Engineering Adhesives

Sales Tool Anaerobic Retaining Compounds

Conditions affecting Cure Rate

- Temperature - Cure rate increases with temperature
- Gap - Cure rate decreases with increasing gap
- Surface Finish - See table to the right -
- Substrates - Cure rate increases with more active metals. See below

Super Active	Active	Inactive	Passive
Very Fast Cure	Fast Cure	Slower Cure	Activator Required
Brass	Steel	Anodized Aluminum	All Non-metal Surfaces
Copper	Nickel	Cadmium Finishes	Painted metals
Magnesium	Aluminium	Chrome Finishes	Laquered finishes
		Passivated Metals	
		Stainless Steel	
		Titanium	
		Zinc	

Surface Finish -

Surface Finish µ in	Cure After 45 mins
325	15%
200	90%
100	50%
22	30%

For more information review the blog on www.permabond.com on the relationship between Air, Metal and Anaerobic Adhesives.

Products

Product	Description	Viscosity cP	Max. Gap Fill		Shear Strength, Steel		Torque, M10 Steel nuts & bolts				Fixture Time, Steel mins	Temperature Range			
							Breakaway		Prevail			Min.		Max.	
			in	mm	psi	N/mm²	in•lb	N•m	in•lb	N•m		°F	°C	°F	°C
HH040	General purpose, large gap fill	5,000	0.010	0.254	2,000	14	200	23	300	34	15	-65	-54	300	150
HH040 Pure	General purpose, NSF/ANSI 61 Certified	5,000	0.010	0.254	2,000	14	200	23	300	34	15	-65	-54	300	150
HL138	General purpose, press fit	150	0.005	0.127	2,300	16	180	20	320	36	10	-65	-54	300	150
HM160	General purpose, slip fit	600	0.008	0.203	3,000	21	250	28	400	45	10	-65	-54	350	177
HM161	Gap filling, slip fit	2,000	0.010	0.254	3,500	24	275	31	400	45	10	-65	-54	350	177
HM162	Fast curing, high temperature resistance	800	0.008	0.203	4,300	30	280	32	550	62	5	-65	-54	390	200
HM165	Maximum gap fill, high temperature resistant	10,000	0.012	0.305	3,800	26	250	28	480	54	15	-65	-54	445	230
HH167	Silver, metal repair, gap filling	500,000	0.012	0.305	4,700	32	280	32	400	45	15	-65	-54	300	150

Products above are all green in color except HH167 which is colored silver.

Typical Applications

Retaining compounds are typically used on the following.

- Bearings into housings
- Bushings
- Cylinder linings
- Gears
- Keyways and splines
- Pulleys
- Railings and hand rails
- Rotors

Terms

Break and Prevail are listed for consistency. Shear strength is the more pertinent value for most retaining applications.

Break

The torque required to initially loosen the threaded fastener.

Prevail

The average torque required to turn the threaded fastener 360 degrees after the initial "break".

Shear Strength

The force required to break the bond between a pin and collar.

Keep in mind that the strengths above are for threaded M10 fasteners. Actual strength 'retained' can be higher or lower based on total surface area.

Permabond Engineering Adhesives

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Finding Manufacturers

The Thomas directory (www.thomasnet.com) is a popular source of information regarding manufacturers of specific products.
Alternatively, Permabond is more than happy to investigate specific target areas for you and can also advise of any branches of multinational Permabond users who may be in your area. Email info.americas@permabond.com with your request.

Competitor	Permabond Advantage
ASI	On-time delivery and consistent product quality.
Cyberbond	
Delo	Wide range of high quality products with good profit margins.
Henkle Loctite	Permabond is "Distributor friendly"
Hernon	Technical support and custom formulations
Holdtite	High quality products backed by exceptional support staff
Ritelok	Unquestioned product performance with a full range of customer and technical support
Threebond	Certified quality management system and global support network.

↑Permabond HL138

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↑Permabond HM162 is used as a threadlocker in this case to secure the rear assist camera mount.

Additional Resources

Application Profiles Available:

- ***A1046 Brake Cylinder***
- ***HM161 Paint Shaker Cylinder***
- ***HM162 Forklift***
- ***HM162 Gas Meter Sealing***
- ***HM162 Rear Assist Camera***
- ***HM163 Handrail***
- ***HM165 Brake Caliper Sleeving***

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"Our Science ... Your Success"

Permabond Identification System

Permabond anaerobic identification system consists of two letters followed by three numbers. The letters indicate strength and viscosity, the numbers are unique for each product.

• H = High • M = Medium • L = Low

The first letter represents strength, the second represents viscosity.

Example: HM162 = High strength + Medium viscosity

Business Development Permabond's business development team will support your efforts finding manufacturers in your area. Contact Permabond for assistance prospecting, sales tools and training information.

Sales Permabond's sales engineers are available to support you in selecting the best possible adhesive solution for your customer, further training and joint visits.

Technical Support The experienced team of Permabond chemists is on hand to support you with product information, testing, and custom formulations.

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