

Features & Benefits

- Simple one-part system
- Shaft-hub assemblies can be made with slip fits
- Expensive press fits can be eliminated
- High viscosity for maximum gap filling ability
- Excellent shear strength
- Superior environmental resistance
- Thixotropic viscosity allows easy dispensing

Description

Permabond® HH040 is a single component liquid that cures only when in contact with metal parts and oxygen is excluded. The liquid adhesive fills the "air space" between parts and upon cure unitizes and retains male and female parts. Thus it prevents their movement relative to each other, eliminating wear, erosion, and pitting. HH040 cures to a tough cross-linked plastic that will prevent the corrosion of mated parts and provides excellent environmental and temperature resistance.

Physical Properties of Uncured Adhesive

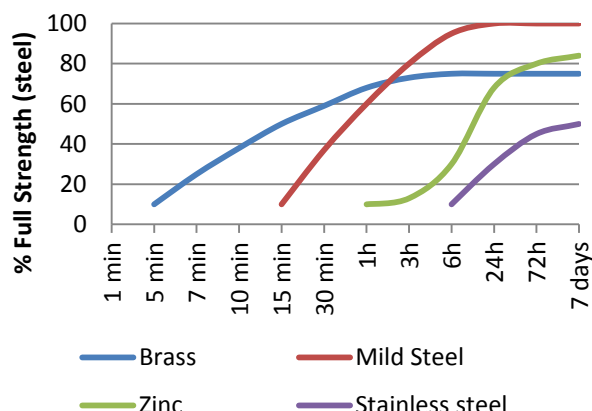
| | |
|----------------------|------------------------------|
| Chemical composition | Acrylic |
| Appearance | Green |
| Viscosity @ 25°C | 5,000 mPa.s (cP) Thixotropic |
| Specific Gravity | 1.1 |
| UV fluorescence | Yes |

Typical Curing Properties

| | |
|---|------------------------|
| Maximum gap fill | 0.25 mm 0.01 in |
| Maximum thread size | M30 ¾" |
| Time taken to reach handling strength (M10 steel) @23°C | 15 minutes* |
| Time taken to reach working strength (M10 steel) @23°C | 1 hour |
| Full strength (M10 steel) @23°C | 24 hours |

*Handling time at 23°C / 73°F. Copper and its alloys will make the adhesive cure more quickly, while oxidised or passivated surfaces (like stainless steel) will reduce cure speed. To reduce curing time, use Permabond activator A905 or ASC10. Alternatively, increasing the curing temperature will reduce curing time.

Strength Development



*Cure times are typical at 23°C. Copper and its alloys will follow the faster cure while oxidised or passivated surfaces like stainless steel will tend towards the slower curve. Lower temperatures or large gaps will tend to extend the cure time. To reduce the cure time the use of Permabond A905, ASC10, or heat can be considered.

Typical Performance of Cured Adhesive

| | |
|--|--|
| Torque strength (M10 steel ISO10964) | Break 25 N·m 220 in.lb Prevail 37 N·m 330 in.lb |
| Shear strength (steel collar & pin ISO10123) | 14 MPa 2000 psi |
| Coefficient of thermal expansion | 90 x 10 ⁻⁶ mm/mm/°C |
| Dielectric strength | 11 kV/mm |
| Thermal conductivity | 0.2 W/(m.K) |

Effect of Anaerobic Retaining Compound on Push-Off Force*

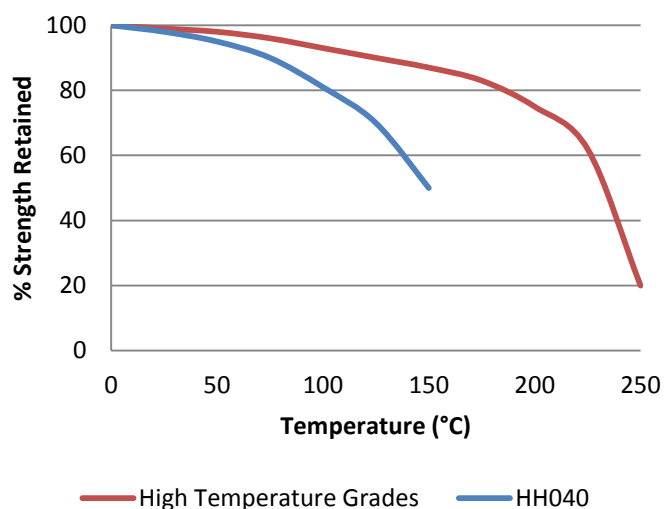
| | Clearance (inches) | Finish (micro-inches) | Push-Off force (psi) |
|------------------|--------------------|-----------------------|----------------------|
| Interference fit | -0.0005 | 6 | 2100 |
| Slip fit HH040 | +0.002 | 6 | 2350 |
| Slip fit HH040 | +0.002 | 63 | 3400 |

*1/2 inch steel collar & pin.

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.

Hot Strength



"Hot strength" Breakaway strength on M10 Zinc plated bolts according to ISO 10964. Cured at 23°C for 24 hours then conditioned for 30 minutes at testing temperature.

HH040 can withstand higher temperatures for brief periods (such as for paint baking and wave soldering processes) providing the joint is not unduly stressed. The minimum temperature the cured adhesive can be exposed to is -55°C (-65°F) depending on the materials being bonded.

Joint Strength

The amount of bonded area, the bondline thickness and the surface finish of the cylindrical parts determine the strength of a joint.

The bond area and bondline thickness (clearance) depend on the design of the joint. As the gap (clearance) between parts increases, some loss of strength is experienced. Maximum strength is obtained when the diametrical clearance does not exceed 0.005 inches.

| Clearance (inches) | % Strength Retained | Surface Finish (micro-inches)* | % Strength Retained |
|--------------------|---------------------|--------------------------------|---------------------|
| 0.0025 | 93% | 8 | 45% |
| 0.0050 | 91% | 32 | 57% |
| 0.0075 | 85% | 64 | 70% |
| 0.0100 | 62% | 70 | 100% |

* Micro-inches = 1×10^{-6} in.

A machine finish will usually yield a surface roughness of 60 to 80 micro-inches that will typically give optimum strength when using HH040.

Surface Preparation

Though the anaerobic adhesives will tolerate a slight degree of surface contamination, best results are obtained on clean, dry and grease free surfaces. The use of a suitable solvent-based cleaner (such as acetone or isopropanol) is recommended. In general, roughened surfaces (~25µm) give higher bond strengths than polished or ground surfaces.

To reduce the curing time, especially on inactive surfaces (such as zinc, aluminium and stainless steel), the use of Permabond A905 or ASC10 can be considered.

Directions for Use

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

This product is not recommended for use in contact with oxygen, oxygen rich systems and other strong oxidizing materials. This product may adversely affect some thermoplastics and users must check compatibility of the product with such substrates before using.

Storage & Handling

| | |
|---|------------------------|
| Storage Temperature | 5 to 25°C (41 to 77°F) |
| Users are reminded that all materials, whether innocuous or not, should be handled in accordance with the principles of good industrial hygiene. Full information can be obtained from the Safety Data Sheet. | |

Contact Permabond:

- Americas +1 732 868 1372
- US 800-640-7599
- Asia + 86 21 5773 4913
- Europe +44 (0) 1962 711661
- UK 0800 975 9800
- Deutschland 0800 111 388
- France 0805 111 388

info.americas@permabond.com

info.europe@permabond.com

info.asia@permabond.com

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.