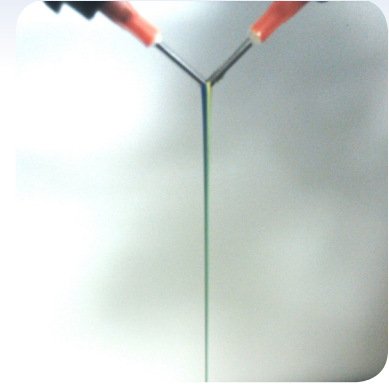


Electric Motor Adhesives - Magnet Bonding Applications



Permabond's magnet bonding adhesives have been developed to provide outstanding strength performance on substrates such as steel, ferrite, neodymium and other magnet materials.

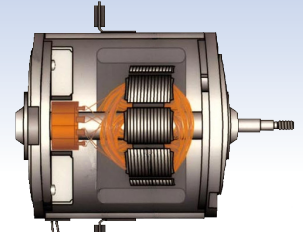
Additional applications for adhesives and sealants in electric motors are listed on the following pages.



| | TA437 | TA439 | TA459 | TA4591 | TA4592 | ES550 | ES568 |
|----------------------------------------------------|----------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|
| Type | Single Component & Surface Activated Acrylic | Surface Activated Acrylic | Surface Activated Acrylic | Surface Activated Acrylic | Two-Part External Mix Acrylic | Heat Cure Epoxy | Heat Cure Epoxy |
| Color | Orange | Amber | Blue | Clear | Blue / Yellow-green | Silver-grey | Ivory |
| Initiator | 41 | 43 | 43 | 44 | NA | NA | NA |
| Feature | Single Component | Low Viscosity | High Viscosity | Clear | External Mix | Non-sag | High Strength |
| Viscosity cP = mPa | 120,000 | 1,000 | 15,000 | 15,000 | 12,500 | 1,500,000 | 55,000 |
| Gap Fill (inch) mm | (0.02") 0.5 | (0.02") 0.5 | (0.02") 0.5 | (0.02") 0.5 | (0.04") 1 | (0.12") 3 | (0.02") 0.5 |
| Fixture Time | 3-5mins or 30-45 secs with Initiator 41 | 10 - 30 secs | 15 to 30 secs | 15-30 secs | 10-30 secs | Not Applicable | Not Applicable |
| Cure Time (hours) | 24 hours | 24 hours | 24 hours | 24 hours | 24 hours | 30 mins @150C (300F) | 15 mins @150C (300F) |
| Temperature Resistance (F) C | (-65 to 390) -54 to 200 | (-65 to 250) -54 to 120 | (-40 to 250) -40 to 120 | (-65 to 300) -54 to 149 | (-65 to 311) -54 to 155 | (-40 to 355) -40 to 180 | (-40 to 355) -40 to 180 |
| Shear Strength Steel after 24 hours | 14-20 N/mm ² (2000-3000) psi | 20-25 N/mm ² (2900-3600) psi | 20-25 N/mm ² (2900-3600) psi | 20-25 N/mm ² (2900-3600) psi | 20-25 N/mm ² (2900-3600) psi | 27-41 N/mm ² (4000-6000) psi | 27-41 N/mm ² (4000-6000) psi |
| Shear Strength Ferrite/Steel after 3 mins | 4 MPa (600 psi) | 4 MPa (600 psi) | 4 MPa (600 psi) | 4 MPa (600 psi) | 4 MPa (600 psi) | Not Applicable | Not Applicable |
| Shear Strength Ferrite/Steel after 24 hours | >14 MPa (2000 psi) substrate failure | >14 MPa (2000 psi) substrate failure | >14 MPa (2000 psi) substrate failure | >14 MPa (2000 psi) substrate failure | >14 MPa (2000 psi) substrate failure | >14 MPa (2000 psi) substrate failure | >14 MPa (2000 psi) substrate failure |
| Acid Free Non-corrosive | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Impact Strength | 10 – 20 KJ/m ² | 10 – 20 KJ/m ² | 10 – 20 KJ/m ² | 10 – 20 KJ/m ² | 10 – 20 KJ/m ² | 20 – 30 KJ/m ² | 25 – 35 KJ/m ² |

Electric Motor Adhesives

Permabond adhesives and sealants are used to bond magnets, seal end plates, retain bearings, pot and reinforce wires and a variety of other applications. Permabond is trusted on motors throughout diverse industries, from the very large wind turbine motors to super small electronics motors.



Vacuum Motor



Application: Retaining Bearings to Shaft

Permabond HL138 retains the bearings to the press fit shaft. Permabond HL138 is a low viscosity anaerobic sealant which cures in the presence of metal and absence of oxygen.

Benefits of Permabond anaerobic retaining compounds:

- Single component - No Mix Step Required
- Fast Fixture Speed - Efficient Process
- Ambient Cure - Energy Efficient
- Good Shelf Life - No refrigeration or freezing needed
- Increases load carrying capacity up to five times that of the press fit.

Adhesive used: Permabond HL138

Power Window Motor

Application: Bonding power window motor magnets

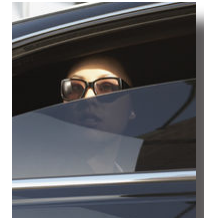


Permabond TA459, a two component, structural acrylic rapidly bonds the motor magnets in this enclosed system.

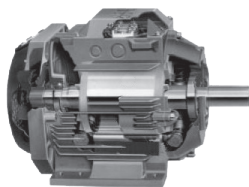
Benefits of Permabond structural acrylics:

- Very High Impact & Shear Strength
- Excellent Durability
- Fast Fixture Speed- Efficient Process
- No Mix Step Required
- Ambient Cure - Energy Efficient
- Good Shelf Life - No Refrigeration or Freezing Needed
- TA4590 is Non-corrosive to Copper Components

Adhesive used: Permabond TA459 with Initiator 43



Yaw Drive and Directional Motor



Application: Yaw Drive Motor

Permabond HH190 is a purple, high viscosity, high strength, flange sealant that prevents corrosion. Permabond HH190 conforms to the shape of the flange allowing 100% surface-to-surface contact. It is non-shimming, resulting in uniform stress distribution and eliminates the need for re-torquing.

Permabond HH190 provides seal up to 5000psi with excellent vibration, chemical and shock resistance, and is removable with hand tools.

Adhesive used: Permabond HH190

Computer Fan Motor



Application: Bonding computer fan motor magnets

Permabond 910 bonds the motor magnets and motor housing into the frame.

Benefits of Permabond cyanoacrylate adhesives:

- Instant Fixture - No Clamping Necessary
- Ambient Cure - Energy Efficient
- Easy Process for These Small Components

Adhesive used: Permabond 910



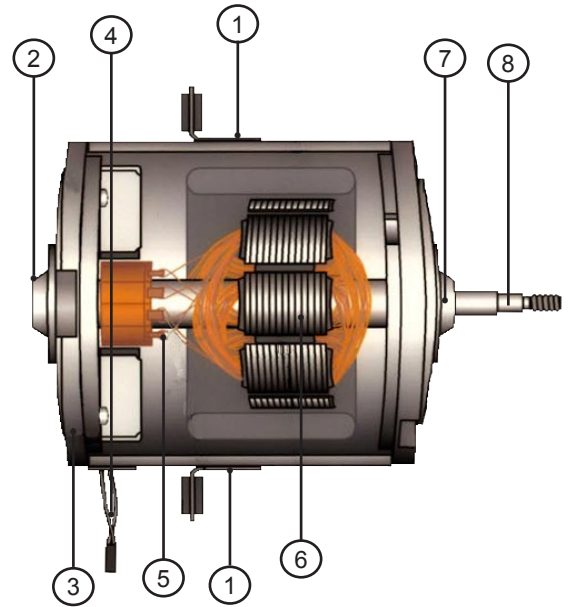
Permabond®

Engineering Adhesives

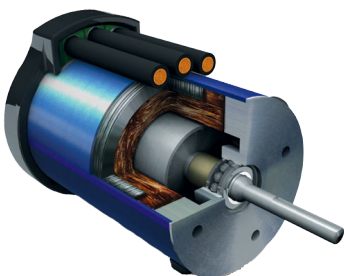
Other Electric Motor Applications

High Strength Bonding - Gasketing - Plate Sealing

Permabond's magnet bonding adhesives have been developed to provide outstanding strength and performance.



| | Application Description | Example Product | Features |
|---|----------------------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 1 | Mounting Brackets | TA4590; ET515 | TA4590 is a no mix, non corrosive structural acrylic which can be cured quickly with Initiator 43. ET515 is a 2-part epoxy. |
| 2 | End Plate Sealing | HH190; LH197 | HH190 is high strength, LH197 is flexible. |
| 3 | Brush Holder to Bracket & Bracket to Housing | TA4590, TA437; ET515 | TA4590 is non-corrosive, TA437 has higher temperature resistance. ET515 has excellent impact strength. |
| 4 | Wire Potting | ET515 | UV's are also available for high speed cure. |
| 5 | Wire Reinforcement on Rotor Tangs | ES578; ET538 | ES578 is a single component non sag epoxy, ET538 is two component room temperature cure. |
| 6 | Paper Sleeves onto Motor Prior to Winding | 2011 | 2011 is a thixotropic gel, instant adhesive. |
| 7 | Bearings to Shaft or Frame | HL138 or A126 ; HM162 | HL138 or A126 are for press fits, HM162 fills larger gaps, cures faster and has higher temperature resistance. |
| 8 | Rotor to Shaft | Various products | Permabond has a vast number of adhesives available to suit the variety of motor needs. |



Brushless Electric Motor Applications

High Strength Bonding - Gasketing - Plate Sealing

Permabond's magnet bonding adhesives will provide outstanding strength performance on substrates such as steel, ferrite, neodymium and other magnet materials for brushless motors as well.

www.permabond.com

Contact us

The experienced team of Permabond chemists is on hand to help you with custom formulations and fulfilling your technical data requests.



Permabond's sales engineers are available to assess your production line and find the best possible turnkey adhesive solution that will result in production efficiencies.

www.permabond.com

- **US Helpline - 800-640-7599**
 - **UK - 0800 975 9800**
 - **Asia + 86 21 5773 4913**
 - **Americas +1 732 868 1372**
- **General Enquiries +44(0)1962 711661**
 - **Deutschland 0800 101 3177**
 - **France 0805 111 388**

info.europe@permabond.com

info.americas@permabond.com

info.asia@permabond.com



Permabond Worldwide

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