

Adhesive Solutions for Electric Motors and Auxiliary Power

Permabond adhesives and sealants are used to bond magnets, seal end plates, retain bearings, pot and reinforce wires, and for 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.

Permabond® Adhesive Advantage

Adhesives are preferred over soldering, riveting, mechanical fasteners, tapes, and all types of welding (metal, ultrasonic, and solvent) for the following reasons.

- Reduced cost
- Increased process speed
- Increased material selection as they bond dissimilar substrates
- Improved aesthetic appearance
- Reduced hazards associated with solvents and metal welding
- Increased motor life - will not fracture magnets
- Prevent vibration noise
- Prevent corrosion



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Permabond® Adhesive Types

Permabond offers a wide range of adhesive technologies to suit application requirements including:

- One Component, Heat Cure Epoxy
- Two Component, Room Temperature Cure Epoxy
- Surface Activated Acrylic
- Single Component Acrylic
- Bead on Bead Acrylic
- External Mix Acrylic
- Cyanoacrylate
- Anaerobics
- UV/ Anaerobic
- Urethanes, MS Polymers etc...

Technology	Benefits	Limitations
One Component, Heat Cure Epoxy	Very high strength Heat resistant Excellent enviromental resistance	Cure oven required
Two Component, Room Temperature Cure Epoxy	High strength Room temperature cure Gap filling Heat resistant	Adhesive will cure in dispense tips during idle periods
Surface Activated Acrylic	High strength Fast fixture speed Long open time High strength Acid-free formulations Heat resistant	Two dispense steps
Single Component Acrylic	Easy process	Longer set time Metal surface needed
Bead on Bead Acrylic	High strength	Automated dispensing equipment needed
External Mix Acrylic	High strength Very fast process	Automated dispensing equipment needed
Cyanoacrylate	Fast Good shear strength on many materials	Limited impact strength Limited resistance to polar solvents
Anaerobics	See Threadlocking, Thread Sealing and Retaining	For use on metal only
UV Anaerobic	Fast process	UV Lamp required



Permabond® Adhesive Selection

Adhesive selection is based upon your bonding requirements including:

- Strength Requirements
- Cure Speed
- Temperature Resistance
- Substrates Bonded
- Dispensing Preference
- Cure Preference
- Chemical Resistance
- Environmental Resistance



	<i>Epoxies</i>	<i>Acrylics</i>	<i>Cyanoacrylates</i>
Strength			
Metals	Excellent	Excellent	Very Good
Plastics	1 Part Epoxy: Fair 2 Part Epoxy: Good	MMA's: Excellent Others: Very Good	Excellent
Speed			
Fixture*	1 Part Epoxy: N/A 2 Part Epoxy: ≥ 5 min.	Surface Activated Acrylics: 0.5 - 4 min. Bead-On-Bead: <30 sec. 2 Component: 10 - 35 min. External Mix: 10-30 sec.	5-30 seconds
Full Cure	24 hours	24 hours	24 hours
Resistance			
Temperature	1 Part Epoxy: 350°F (180°C) 2 Part Epoxy: ≤ 212°F (100°C) 2 Part Epoxy with heat cure: 285°F (140°C)	Typical: 250°F (120°C) Specialty grades: 390°F (200°C)	Typical: 180°F (82°C) Specialty grades: 390°F (200°C) Specialty grades with secondary heat cure: 482°F (250°C)
Chemical	Polar Solvents: Very Good Non Polar Solvents: Very Good	Polar Solvents: Good Non Polar Solvents: Very Good	Polar Solvents: Poor Non Polar Solvents: Good
Gap Fill			
	≤ 0.20 in. (5 mm)	≤ 0.02 in. (0.5 mm)	≤ 0.02 in. (0.5 mm)
Permabond® Products			
	ES550 1 Part, No Sag	TA437 High Temp Resist Surface Activated	910 The Original Metal Bonder
	ES558 1 Part, High Impact Strength	TA4590 Acid Free	820 High Temp Resist
	ES578 1 Part, Thermally Conductive	TA440 Bead-On-Bead	919 Highest Temp Resist w/ heat cure
	ET5401 2 Part, High Temp	TA4810 2 Part Ideal for Plastic	2011 Gel
	ET510 2 Part, Flexible	TA4592 External Mix	268 General Purpose
	ET500 2 Part, Fast Set		737 Toughened, Impact Resist

*Dependent on grade, substrate, and gap

Permabond®
Engineering Adhesives

Permabond® Electric Motor Bonding Applications

Historically clips were used to fasten electric motor magnets in place. Today, most magnets are bonded because adhesives significantly reduce cost and increase motor life. Motor manufacturers are aware of the benefits of adhesives for magnet bonding and are incorporating adhesives throughout motors to further increase the quality of their motor assemblies.

- Magnet Bonding
- Mounting Brackets
- Bonding Brush Holder to Bracket
- Bonding Bracket to Housing

Epoxy, structural acrylic and cyanoacrylates are used depending on the application requirements for strength, speed, temperature, chemical and environmental exposure.

Permabond® Electric Motor Epoxy Adhesives

These Permabond epoxy adhesives form strong durable bonds which resist temperatures of 355°F (180°C). Permabond ES550 is a non-sag epoxy and ES568 is free flowing. Free flowing epoxies can be applied to the joint on top of the assembled magnet and can. When exposed to heat during cure, the epoxy flows prior to curing to fill the space between the two components. Non-sag epoxies are applied between the joint and will not flow during cure.

Benefits of One Component Epoxy

- Very High Temperature Resistance
- Very High Shear and Impact Strength
- Excellent Environmental Resistance

Benefits of One Component Epoxy Process

- One Step Dispense Process
- Fast Full Cure Time

Product	ES550	ES568
Type	Heat Cure Epoxy	Heat Cure Epoxy
Color	Silver-grey	Ivory
Initiator	NA	NA
Feature	Non-sag	Free flowing
Viscosity cP = mPa	1,500,000	55,000
Gap Fill	(0.20") 5mm	(0.02") 0.5mm
Cure Time	130° C (266°F): 75 min. 150°C (300°F): 60 min. 170°C (338°F): 40 min.	135°C (275°F): 35 min. 150°C (300°F): 20 min. 170°C (338°F): 10 min.
Temperature Resistance	(-40°F to 355°F) -40°C to 180°C	(-40°F to 355°F) -40°C to 180°C
Shear Strength Steel after 24 hours	27-41 N/mm ² (4,000-6,000) psi	20-25 N/mm ² (2,900-3,600) psi
Shear Strength Ferrite/Steel after 24 hours	>14 MPa (2,000 psi) substrate failure	>14 MPa (2,000 psi) substrate failure
Acid Free Non-corrosive	Yes	Yes
Impact Strength	25 – 35 KJ/m ²	25 – 35 KJ/m ²

Strength results will vary depending on the level of surface preparation and gap.



Permabond® Electric Motor Structural Acrylic Adhesives

Many electric motor magnet bonding applications require fast strength development to meet demanding production requirements. Permabond structural acrylics continue to develop strength for 24 hours but are able to be unclamped in a very short time.

Permabond Surface Activated Structural Acrylics

Examples of Permabond surface activated acrylic line include:

TA437
TA439
TA4590

The adhesive is applied to one surface and the initiator is brushed or sprayed to the other surface.

Upon assembly, strength development occurs rapidly.

Permabond TA437 can be used without the initiator, providing at least one surface is metal and the process can allow for 5 to 10 minutes of fixture time before moving.

Permabond External Mix Structural Acrylic

High speed production lines benefit from the single dispense step and very fast strength development of Permabond TA4592.

The dispensing equipment ensures both components free fall into each other prior to landing on one component of the assembly.

Product	TA437	TA439	TA4590	TA4592
Type	One Part & Surface Activated Acrylic	Surface Activated Acrylic	Surface Activated Acrylic	Two-Part External Mix Acrylic
Color	Orange	Amber	Blue	Blue / Yellow
Initiator	41	41 (43 plastics)	44	NA
Feature	1 Component	Low Viscosity	High Viscosity	External Mix
Viscosity cP = mPa	20 rpm: 40,000 2.5rpm: 130,000	1,000	20 rpm 20,000 2.5rpm 90,000	20 rpm: 9,000 2.5 rpm: 32,000
Gap Fill	(0.02") 0.5mm	(0.006") 0.15mm	(0.02") 0.5mm	(0.04") 1mm
Fixture Time	20-30 secs*	20 - 40 secs	15 - 30 secs	10 - 30 secs
Cure Time	24 hours	24 hours	24 hours	24 hours
Temperature Resistance	-55°C to 200°C (-65°F to 392°F)	-55°C to 165°C (-65°F to 329°F)	-55°C to 165°C (-65°F to 300°F)	-54°C to 155°C (-65°F to 310°F)
Shear Strength Steel after 24 hours	14-20 N/mm ² (2,000-3,000) psi	20-25 N/mm ² (2,900-3,600) psi	20-25 N/mm ² (2,900-3,600) psi	20-25 N/mm ² (2,900-3,600) psi
Shear Strength Ferrite/Steel after 3 mins	4 MPa (600 psi)	4 MPa (600 psi)	4 MPa (600 psi)	4 MPa (600 psi)
Shear Strength Ferrite/Steel after 24 hours	>14 MPa (2,000 psi) substrate failure	>14 MPa (2,000 psi) substrate failure	>14 MPa (2,000 psi) substrate failure	>14 MPa (2,000 psi) substrate failure
Acid Free Non-corrosive	No	Yes	Yes	Yes
Impact Strength	10 – 15 KJ/m ²	15 – 20 KJ/m ²	15 – 20 KJ/m ²	10 – 20 KJ/m ²

Strength results will vary depending on the level of surface preparation and gap.

*TA437 will fixture in 5-10 mins. without initiator on metals.

Permabond® Electric Motor Cyanoacrylate Adhesives

The expanding variety of small motors includes motors with unconventional substrates and unprecedentedly small size. For many of these motors cyanoacrylates are ideal as they bond a variety of substrates quickly.

Product	910®	820	919	737	2011
Feature	Metal Bonder	High Temp Resist	Highest Temp Resist	Toughened	Gel
Temp Resist	90°C (195°F)	200°C (390°F)	250°C (482°F)	120°C (250°F)	120°C (250°F)

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Permabond® Electric Motor Thread Sealing Applications

Seal and lock metal pipe, fittings and junctions with anerobic thread sealants. These sealants offer the following advantages to pipe dope, specialty fittings, and PTFE tape.

- No solvents
- Reduce cost
- No loose particles to clog valves
- Will not shred, creep, or relax over time
- Lubricates for easier assembly, allows accurate positioning of pipes
- Fully cured sealants typically seal to the burst pressure of the pipe
- Grades available for water, gas, air, & hydraulic systems
- Resistant to a wide variety of chemicals

Product	LM012	LH050	LH050 PURE™	LH051	MH052	LH150
Features	No Fillers, Hydraulics Sealing Grade	General Purpose UL Classified	NSF/ANSI 61 Certified, Potable Water Grade	Automatic Dispensing	Medium Strength BAM Approved for Oxygen	Stainless Steel Grade
Color	Brown	White	White	White	Yellow	White
Viscosity	2,000 cP	250,000 cP	2 rpm 450,000 cP 20 rpm 70,000 cP	2 rpm 65,000 cP 20 rpm 25,000 cP	260,000 cP	
Fluorescent	Yes	No	No	Yes	No	
Max Gap Fill	0.008 in	0.020 in	0.020 in	0.020 in	0.020 in	0.020 in
	0.20 mm	0.50 mm	0.50 mm	0.50 mm	0.50 mm	0.50 mm
¹ Shear Strength	750 psi	1,000 psi	1,000 psi	1,450 psi	1,000 psi	
	5 MPa	7 MPa	7 MPa	10 MPa	7 MPa	
² Torque Breakaway	25 in•lb	35 in•lb	35 in•lb	180 in•lb	50 in•lb	
	3 N•m	4 N•m	4 N•m	20 N•m	6 N•m	
² Torque Prevail	15 in•lb	25 in•lb	25 in•lb	100 in•lb	25 in•lb	
	2 N•m	3 N•m	3 N•m	11 N•m	3 N•m	
Fixture	30 min.	120 min.	120 min.	15 min.	120 min.	
Full Cure	24 hr	24 hr	24 hr	24 hr	24 hr	
Temperature Range	-65 to 350°F	-65 to 350°F	-65 to 350°F	-65 to 300°F	-65 to 350°F	
	-55 to 177°C	-55 to 177°C	-55 to 177°C	-55 to 150°C	-55 to 177°C	
Approvals						
UL® Classified		NSF/ANSI 61 Certified		BAM Approved		

Permabond ASC10 is a surface activator for anaerobic adhesives, suitable for use on non-metallic surfaces or on less active metals to accelerate cure speed and allow products to cure through larger gaps.

¹Steel - - - ² M10 Nuts and Bolts



Permabond® Electric Motor Threadlocking Applications

Prevent vibration loosening of through bolts, cover screws, and all motor assembly fasteners with anaerobic threadlockers. Anaerobic threadlockers out perform other methods of locking fasteners.

Benefits include:

- Prevent vibration loosening
- Prevent corrosion
- Reduce cost
- Reduce weight
- Controlled strength (Permanent and Removable grades)



Product	LM113	MM115	MM115 PURE™	HM118	HL126	HH120	HM128	HM129	HH131
Feature	Low Strength	General Purpose	NSF/ANSI 61 Certified	High Strength	Wicking & Weld sealing	Gap Filling	General Purpose	High Strength	High Temperature
Color	Purple	Blue	Colorless	Red	Green	Red	Red	Red	Red
Viscosity	2 rpm 5,000 cP 20 rpm 1,200 cP	2 rpm 5,000 cP 20 rpm 1,300 cP		2 rpm 5,000 cP 20 rpm 1,800 cP	12 cP	7,000 cP	500 cP	500 cP	2 rpm 23,000 cP 20 rpm 7,500 cP
Fluorescent	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Max Gap Fill	0.006 in	0.006 in		0.008 in	0.001 in	0.01 in	0.006 in	0.006 in	0.012 in
	0.15 mm	0.15 mm		0.20 mm	0.05 mm	0.25 mm	0.15 mm	0.15 mm	0.30 mm
Max Bolt Size	3/4"	3/4"		3/4"	1/2"	1 1/2"	3/4"	3/4"	2"
	M20	M20		M20	M10	M30	M20	M20	M56
¹ Shear Strength	750 psi	1,450 psi		2,500 psi	2,200 psi	2,500 psi	2,500 psi	2,500 psi	2,500 psi
	5 MPa	10 MPa		17 MPa	15 MPa	17 MPa	17 MPa	17 MPa	17 MPa
² Torque Breakaway	80 in•lb	140 in•lb		200 in•lb	125 in•lb	275 in•lb	275 in•lb	290 in•lb	240 in•lb
	9 N•m	16 N•m		23 N•m	14 N•m	31 N•m	31 N•m	33 N•m	27 N•m
² Torque Prevail	40 in•lb	60 in•lb		280 in•lb	300 in•lb	300 in•lb	350 in•lb	520 in•lb	480 in•lb
	5 N•m	7 N•m		32 N•m	34 N•m	34 N•m	40 N•m	58 N•m	54 N•m
² Fixture	15 min.	10 min.		10 min.	15 min.	10 min.	15 min.	10 min.	15 min.
Full Cure	24 hr	24 hr		24 hr	24 hr	24 hr	24 hr	24 hr	24 hr
Temp. Range	-65 to 300°F	-65 to 300°F		-65 to 300°F	-65 to 300°F	-65 to 300°F	-65 to 300°F	-65 to 300°F	-65 to 445°F
	-55 to 150°C	-55 to 150°C		-55 to 150°C	-55 to 150°C	-55 to 150°C	-55 to 150°C	-55 to 150°C	-55 to 230°C

For more information on ASTM or Mil Specs, please refer to the technical data sheets or contact Permabond.

¹Steel - - - ²M10 Nuts and Bolts

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Permagond® Electric Motor Retaining Applications

Anaerobic retaining compounds structurally join, unitize, and permanently bond cylindrical parts. Retaining the rotor components onto the motor shaft with anaerobic adhesives and sealants is preferred to joining via frictional or mechanical methods for the following reasons:

- Augment slip fits
 - Prevent corrosion
 - Mount bearings
 - Restore correct fit

- Reduce machining time due to relaxed tolerances
 - Rapid, quick and easy assembly of parts
 - 100% surface-to-surface contact
 - Allow for greater load carrying capacity

Grade	HH040		HH040 PURE™	HL138	HM160	HM161	HM162	HM165	HH167
Features	General purpose, maximum gap fill		General purpose, NSF/ANSI 61 Certified	General purpose, press fit	General purpose, slip fit	Gap fill, slip fit	Fast curing, high temperature resistant	Maximum gap fill, high temperature resistant	Maximum gap fill, metal repair
Color	Green		Colorless	Green	Green	Green	Green	Green	Silver
Viscosity	5,000 cP			225 cP	600 cP	2,000 cP	1,000 cP	2 rpm 25,000 cP 20 rpm 10,000 cP	2 rpm 500,000 cP 20 rpm 90,000 cP
Fluorescing	Yes	No		No	Yes	Yes	Yes	Yes	No
Max Gap Fill	0.010 in			0.005 in	0.008 in	0.010 in	0.008 in	0.012 in	0.02 in
	0.254 mm			0.127 mm	0.203 mm	0.254 mm	0.203 mm	0.305 mm	0.500 mm
¹ Shear Strength	2,000 psi			2,300 psi	2,000 psi	3,500 psi	4,300 psi	2,900 psi	4,700 psi
	14 MPa			16 MPa	14 MPa	24 MPa	30 MPa	20 MPa	32 MPa
² Torque Breakaway	220 in•lb			180 in•lb	270 in•lb	275 in•lb	280 in•lb	310 in•lb	400 in•lb
	25 N•m			20 N•m	30 N•m	31 N•m	32 N•m	35 N•m	45 N•m
² Torque Prevail	330 in•lb			315 in•lb	450 in•lb	400 in•lb	510 in•lb	450 in•lb	280 in•lb
	37 N•m			36 N•m	50 N•m	45 N•m	57 N•m	50 N•m	32 N•m
Fixture	15 min.			10 min.	15 min.	10 min.	5 min.	15 min.	15 min.
Full Cure	24 hr			24 hr	24 hr	24 hr	24 hr	24 hr	24 hr
Temperature Range	-55 to 150°C			-55 to 120°C	-55 to 177°C	-55 to 150°C	-55 to 200°C	-55 to 230°C	-55 to 150°C
	-65 to 300°F			-65 to 250°F	-65 to 350°F	-65 to 300°F	-65 to 390°F	-65 to 445°F	-65 to 300°F

ASC 10 Anaerobic Surface Conditioner

Permagond ASC10 is a surface activator for anaerobic adhesives, suitable for use on non-metallic surfaces or on less active metals to accelerate cure speed and allow products to cure through larger gaps.

¹Steel - - - ² M10 Nuts and Bolts



Permabond® Electric Motor Wire Reinforcement Applications

Protect against wire breakage with structural epoxy. Epoxy provides a higher degree of protection against critical wire failure than that of solvent based varnishes. It is especially important to reinforce the wires that connect to the commutator in DC motors that are expected to perform in high vibration environments or where flexing fatigue is expected.

- High strength wire breakage protection
- Eliminate solvents
- Heat cure and room temperature cure products available



Grade	ES578	ET514	ET538
Description	One component, Heat cure epoxy, Thermally conductive, Electrically insulative	Two component, 1:1 mix ratio Room temp cure epoxy, Resilient	Two component, 1:1 mix ratio Room temp cure epoxy, Extended pot life
Color	Black	Grey	Grey
Viscosity	700,000	Thixotropic Paste	Thixotropic Paste
Specific Gravity	1.6	A: 1.1 B: 1.2	A: 1.1 B: 1.4
Pot Life	-	30-50 min.	120-150 min.
Gap Fill	0.20 in. (5 mm)	0.08 in. (2 mm)	0.20 in. (5 mm)
Hardness	D 80 - 85	D 60 - 75	D 70 - 80
Elongation	<3%	10 - 15%	4 - 8%
Dielectric Strength			
Thermal Conductivity	1.3 W/(m.K)	0.3 W/(m.K)	0.55 W/(m.K)
Tg Glass Transition	105°C (220°F)	40-50°C (104-122°F)	45-55°C (113-131°F)
Shear Strength Steel	4,000 - 6,000 psi 27 - 41 N/mm ²	2,600 - 2,900 psi 18 - 20 N/mm ²	2,600 - 2,900 psi 18 - 20 N/mm ²
Handling Strength	-	1 - 2 hour	3 - 5 hour
Full Cure	130°C (266°F) 75 min. 150°C (300°F) 60 min. 170°C (338°F) 25 min.	Room Temperature 24 hour	Room Temperature 24 hour
Temp Resist	180°C (355°F)	80°C (175°F)	100°C (212°F)

For full, up-to-date technical information, please refer to the TDS (Technical Data Sheet).

Permabond® Electric Motor Tacking and Bonding Applications

Cyanoacrylates are preferred to tack wires, paper sleeves, insulation, etc... into place to securely hold them in the proper position during assembly. They are also used to reinforce wires and other fragile components. A few industry favorites are listed below. Benefits include:

- Fast set
- Excellent adhesion to a variety of substrates
- No equipment required
- Additional products and viscosities variations are available.
- Excess adhesive can be cured with a spray of accelerator
- Primer available to increase adhesion to polyolefins



	Grade	Description	Viscosity	Gap Fill		Shear Strength*		Set Time		Temperature Range	
			23 °C	Max.		Steel		Plastic	Metal	Lower	Upper
			cP	in.	mm	psi	MPa	sec.	sec.	°C (°F)	°C (°F)
General Purpose	101	Wicking type	2-3	0.002	0.05	2,800-3,300	19-23	5-10	3-5	-55 (-65)	82 (180)
	105	Elastomer bonding	30-50	0.004	0.10	2,600-3,200	18-22	5-10	10-15	-55 (-65)	82 (180)
	268	Fast curing max. gap fill	1,200-2,400	0.017	0.43	2,900-3,200	20-22	5-10	5-10	-55 (-65)	82 (180)
	2010	Thixotropic, max. gap fill	15,000	0.020	0.50	2,800-3,300	19-23	10-15	10-15	-55 (-65)	82 (180)
Metals	170	Maximum gap fill	1,000-2,000	0.015	0.38	3,300-3,600	23-25	10-20	10-20	-55 (-65)	90 (195)
	910	The Original!	70-90	0.006	0.15	3,300-4,200	23-29	10-15	10-15	-55 (-65)	90 (195)
	910FS	Wicking type	2-4	0.002	0.05	3,300-4,200	23-29	<10	<10	-55 (-65)	90 (195)
Toughened	731	Excellent strength	100-200	0.006	0.15	3,500-4,400	24-30	15-20	<30	-55 (-65)	120 (250)
	735	731 - black	100-200	0.006	0.15	3,500-4,400	24-30	5-10	30-50	-55 (-65)	120 (250)
	737	Impact resist., gap fill, black	2,000-4,000	0.020	0.50	2,800-3,300	19-23	5-10	15-20	-55 (-65)	120 (250)
Surface Insensitive	790	Very fast set	1-3	0.002	0.05	2,600-3,200	18-22	2-3	2-3	-55 (-65)	82 (180)
	795	Fast curing	400-600	0.007	0.18	2,600-3,200	18-22	3-6	3-6	-55 (-65)	82 (180)
	799	Fast curing	4,000-6,000	0.020	0.50	2,900-3,200	20-22	6-10	6-10	-55 (-65)	82 (180)
	2011	Non-sag	Gel	0.020	0.50	2,900-3,500	20-24	5-10	5-10	-55 (-65)	120 (250)
High Temp. Resistant	801	Resists to 130°C	10-15	0.002	0.05	2,800-3,300	19-23	10-15	10-15	-55 (-65)	130 (270)
	802	Resists to 160°C	90-110	0.006	0.15	2,800-3,300	19-23	10-15	10-15	-55 (-65)	160 (320)
	820	Resists to 200°C	90-110	0.006	0.15	2,800-3,300	19-23	10-15	10-15	-55 (-65)	200 (390)
	919	Resists to 250°C*	2-6	0.002	0.05	2,900-3,200	20-22	<20	<20	-55 (-65)	250 (482)*
	922	Resists to 250°C*	1,200-2,000	0.017	0.43	2,800-3,300	19-23	<45	<20	-55 (-65)	250 (482)*
Low Odor	940	Low odor & non-blooming	3-10	0.002	0.05	2,300-2,900	16-20	10-15	10-15	-55 (-65)	82 (180)
	943	Low odor & non-blooming	90-110	0.006	0.15	2,300-2,900	16-20	5-10	10-15	-55 (-65)	82 (180)
	947	Low odor & non-blooming	900-1,500	0.010	0.25	2,300-2,900	16-20	20-30	10-15	-55 (-65)	82 (180)

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 whether the product is of acceptable quality and is suitable for their particular purpose, under their own operating conditions.

The products discussed herein are sold without any warranty, expressed 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 the products discussed herein shall be construed to imply the non-existence of any relevant patents or to constitute a permission inducement, or recommendations to practice any invention covered by any patent without authority from the owner of the patent. Purchasers of Permabond products are expected to indemnify and hold harmless Permabond from and against all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use of Permabond products in any manner not intended by Permabond. This limitation of liability shall not be construed to limit the availability of any product liability remedy available to purchasers under applicable law. Permabond's participation in the International Franchise Association's (IFA) International Franchise Association's Responsible Care® program.

Please refer the technical data sheet for the most up to date information on each product. While every effort has been made to insure the accuracy of the information provided, Permabond cannot be held responsible for typographical errors.

Permabond® Electric Motor Lamination Bonding

Bonding reduces corrosion, eliminates hum, and reduces interlaminar loss. Products are available with excellent thermal conductivity. Because needs vary so greatly, Permabond produces a variety of adhesive types that are trusted in laminations. Please contact Permabond to discuss which option will suit your requirements.

- Eliminate hum
- Reduce interlaminar loss
- Prevent corrosion

Type	Properties
Single Component Epoxy	Grades with excellent thermal conductivity Withstands machining, grinding, and other finish processes
Surface Activated Acrylic	Room temperature cure Withstands machining, grinding, and other finish processes
Cyanoacrylates	Wicking grades ideal for post assembly High temperature resistant grades available
UV / Anaerobic Cure	Room temperature cure Wicking grades ideal for post assembly

Eliminate costs associated with delamination and broken stacks! Contact Permabond for a product recommendation to suit your application.

Adhesive Solutions for Electric Motors and Auxilliary Power

Permabond adhesives and sealants are available worldwide through authorized distributors.

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