



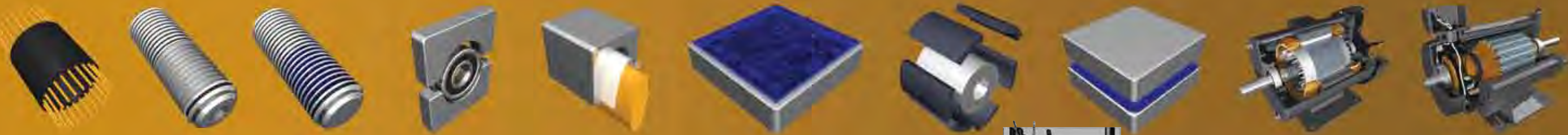
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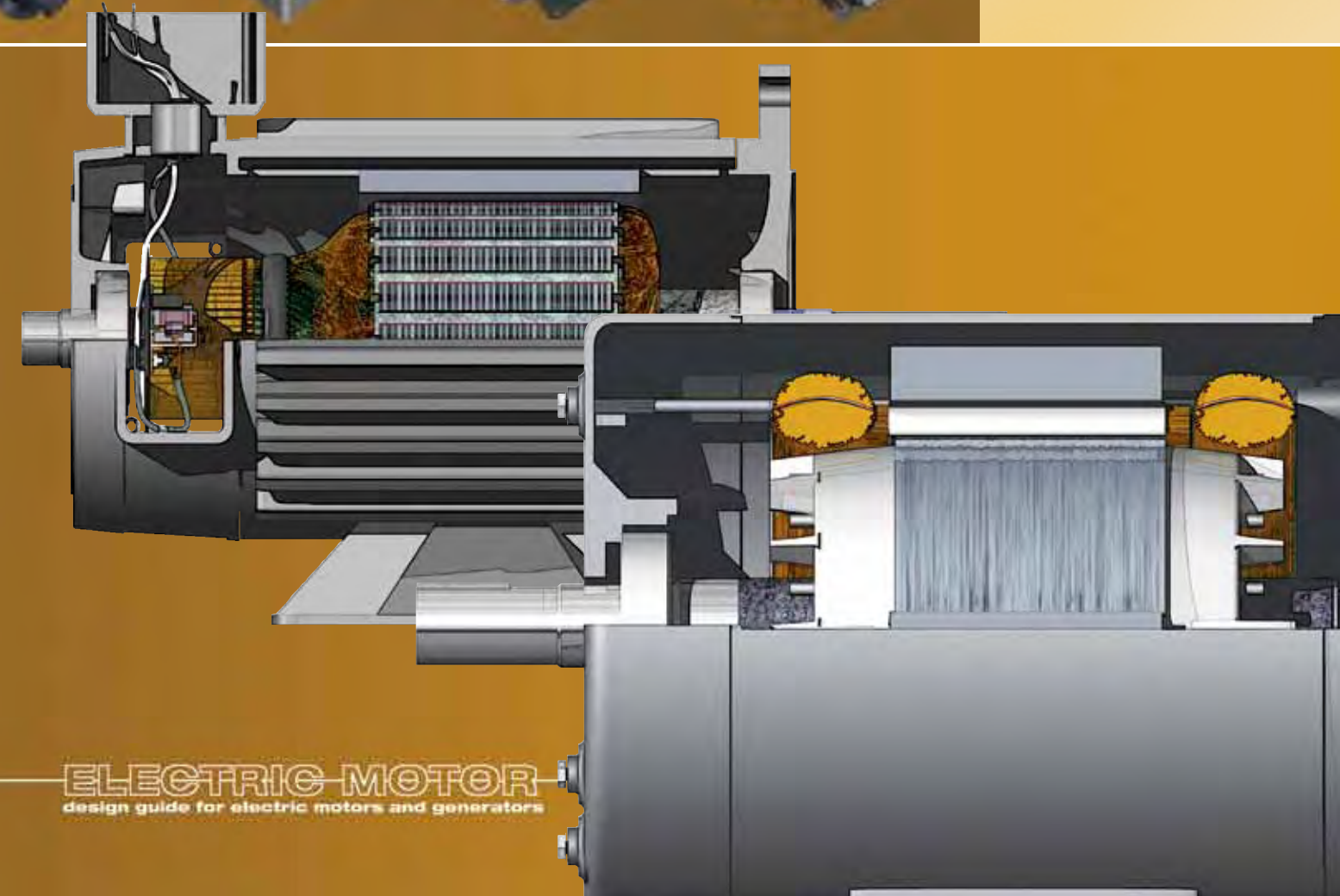
## Design Guide for **ELECTRIC MOTORS AND GENERATORS**



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**ELECTRIC MOTOR**  
design guide for electric motors and generators



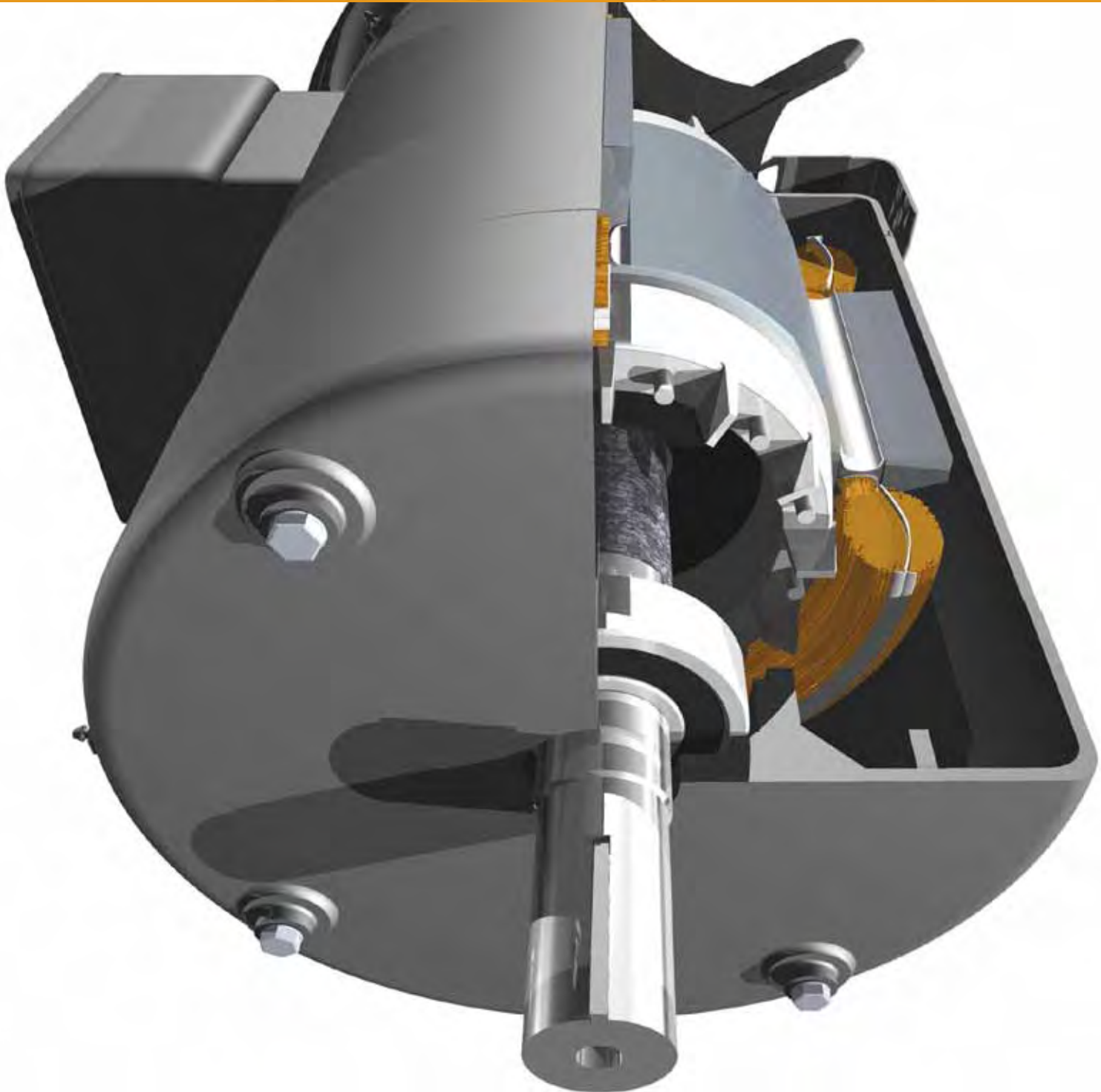


## TABLE OF CONTENTS

### INTRODUCTION

### MOTOR CUTAWAYS

DC Motor	2
AC Motor	4
<b>APPLICATIONS</b>	
General Bonding	6
Magnet Bonding	8
Gasketing	10
Potting	12
Retaining	14
Tacking	16
Threadlocking	18
Thread Sealing	20
Wire Reinforcement	22
Surface Treatment	24
<b>PRODUCT SELECTOR</b>	26



## INTRODUCTION

Electric motor and generator manufacturers have used Loctite® brand products to improve performance, to facilitate manufacturing processes, and to reduce costs for more than 40 years. While almost all manufacturers use adhesives and sealants in some assembly operations, very few manufacturers have developed the experience to take full advantage of the benefits that adhesives and sealants can offer. The objective of this design guide is to educate design, manufacturing, and quality engineers on where and why adhesives and sealants are commonly used on motors and generators to help them recognize the full potential of these products.

*To accomplish this, the following key areas are reviewed in this design guide:*

**Typical Applications** A detailed review of the common applications of adhesives and sealants on motors and generators. This includes illustrations, an overview, a comparison of the adhesive technologies suitable for that application, and a product selector guide.

**Product Selector** One table that summarizes all the adhesives and sealants that are most commonly used on electric motors.

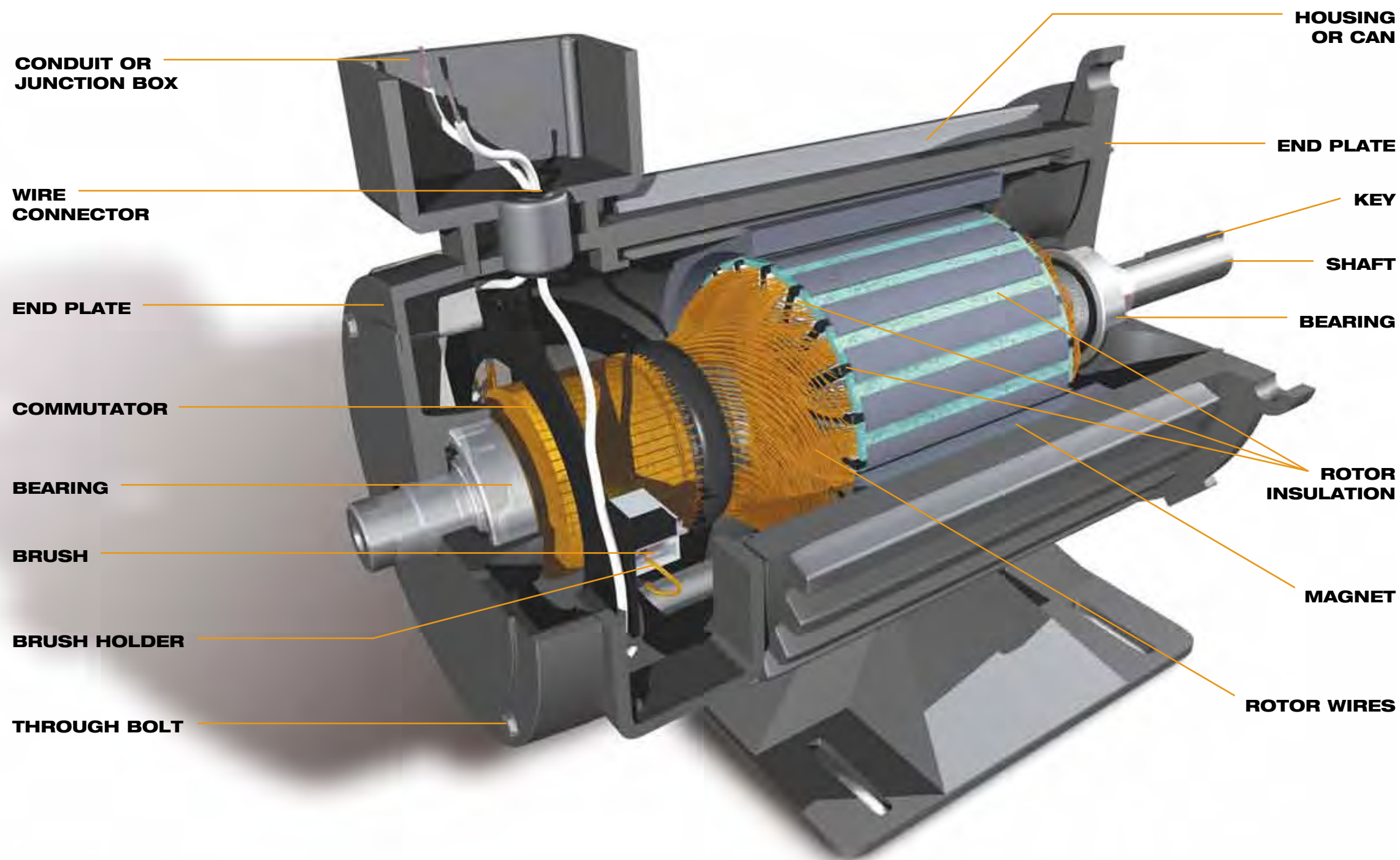
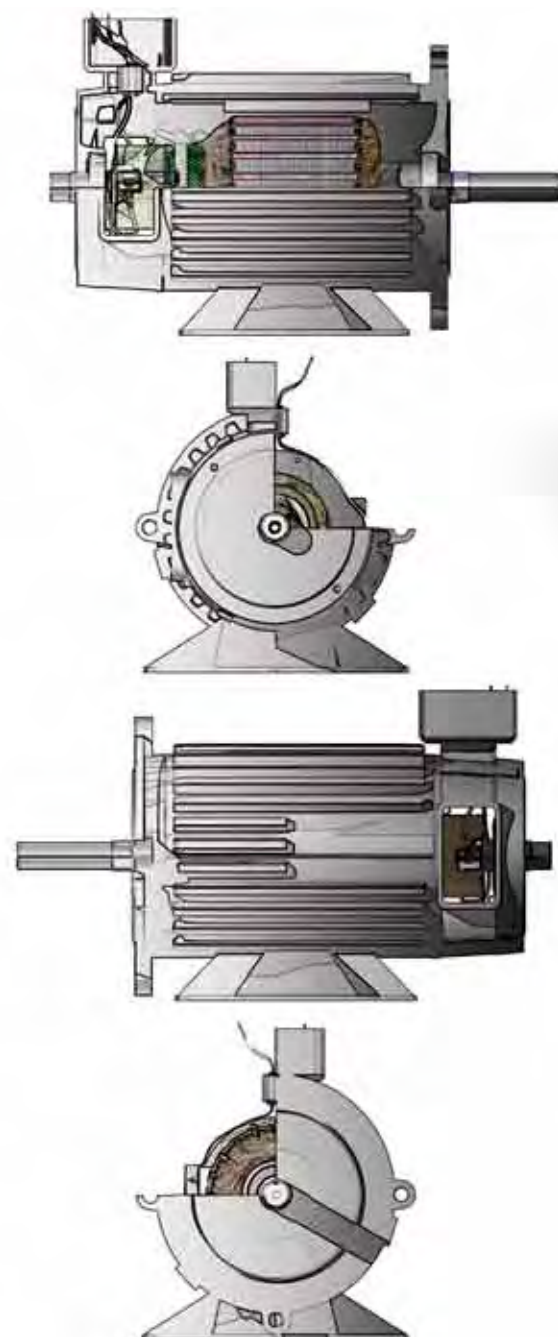


# ELECTRIC MOTOR

dc motor cutaway



## DC MOTOR CUTAWAY





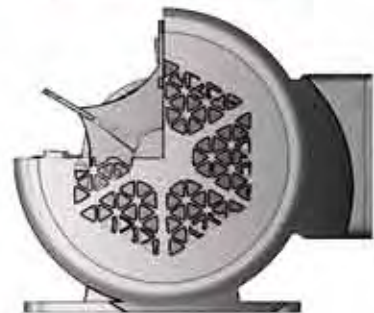
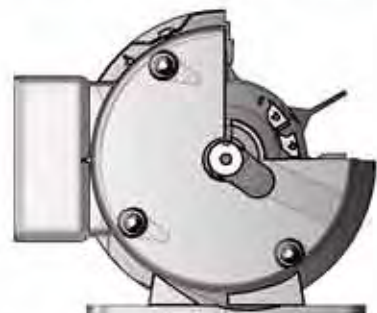
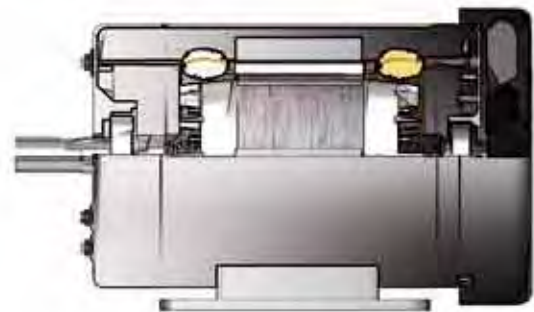
# ELECTRIC MOTOR

ac motor cutaway



## AC MOTOR CUTAWAY

AC MOTOR CUTAWAY



STATOR  
WINDING

STATOR WIRE  
INSULATION

THROUGH BOLT

END PLATE

KEY

SHAFT

BEARING

END PLATE

FAN

BEARING

ROTOR

STATOR SLOT  
INSULATION

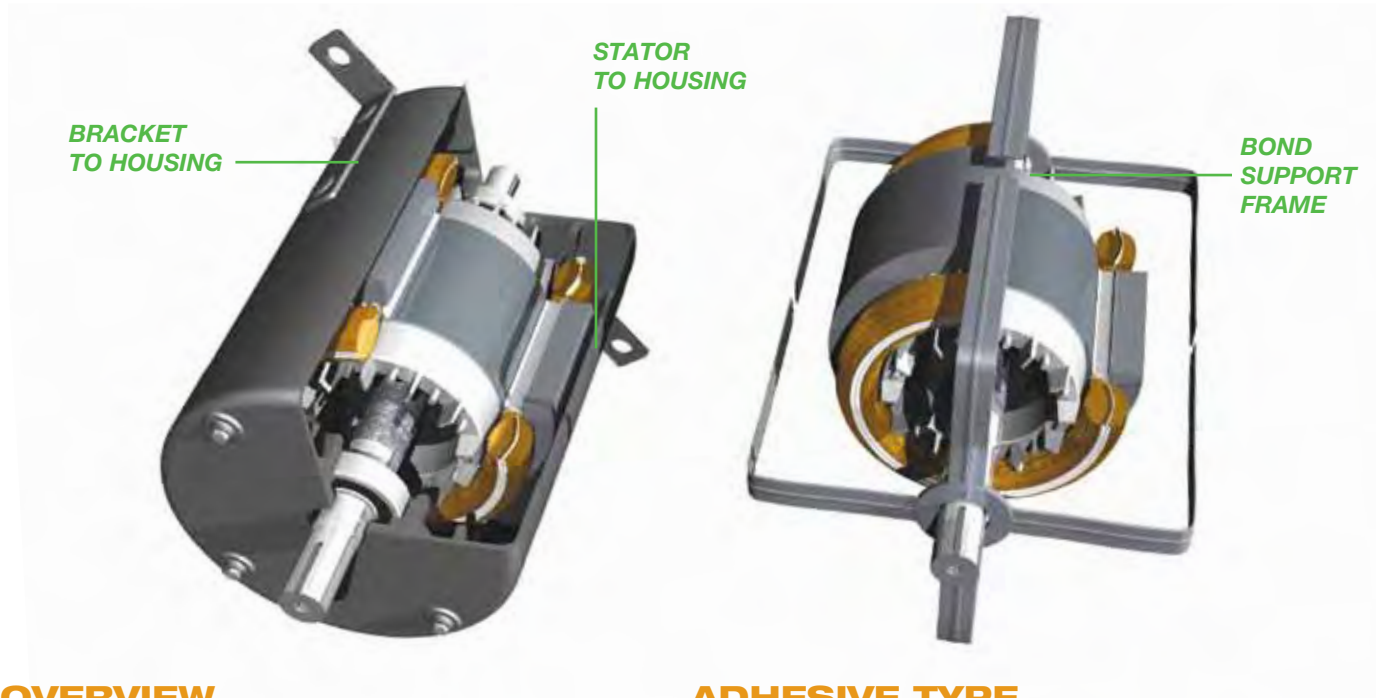
STATOR

HOUSING





TYPICAL APPLICATIONS



OVERVIEW

General bonding applications are usually characterized by the use of an adhesive as the sole means of structurally joining two parts that have a relatively small gap between them, typically 0.002" to 0.10". Adhesives are widely used for bonding applications instead of welding, soldering, ultrasonic welding, riveting, mechanical fasteners, or tapes.

The key benefits of adhesives over these alternative methods are:

- Lower cost
- Easily automated
- Stresses evenly distributed
- Better cosmetic appearance
- Dissimilar substrates bonded




ADHESIVE TYPE  
COMPARISON

There is a wide variety of adhesives that can be used for general bonding applications. The key selection criteria involves, but is not limited to, the following adhesive properties:

- Cure speed
- Temperature/environmental resistance
- Cost
- Adhesion to substrates
- Processing requirements (dispensing and curing)

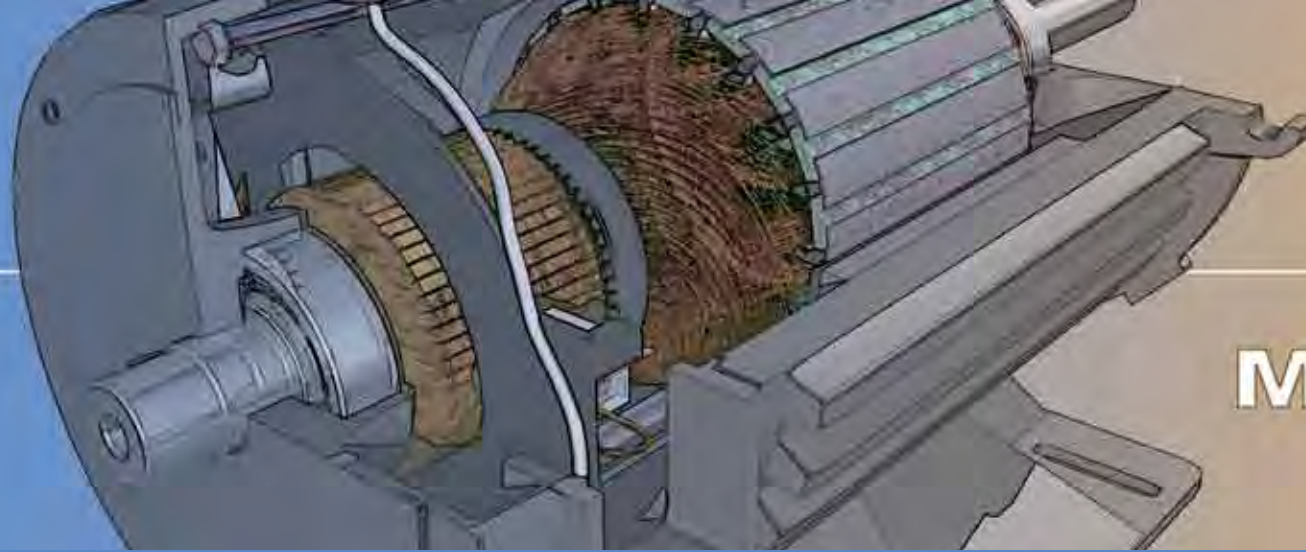
Table 1 compares and contrasts the most commonly used types of adhesives for bonding.

TABLE 1. COMPARISON OF ADHESIVE TYPES FOR GENERAL BONDING

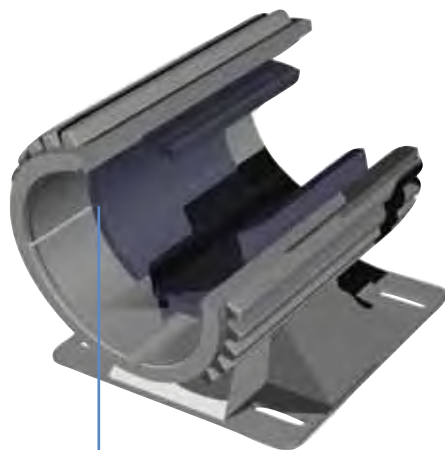
Attribute		Acrylic, Two-Step	Acrylic, Two-Part	Cyanoacrylate	Epoxy / Polyurethane, Two-Part	Hot Melt	Epoxy, Heat Cure, One-Part	Elastomeric Bonding
Overview								
Key Benefits		<ul style="list-style-type: none"><li>• Fast fixture speed</li><li>• No mixing</li><li>• Long open time</li><li>• High impact strength</li><li>• Acid-free</li><li>• Excellent temperature resistance</li></ul>	<ul style="list-style-type: none"><li>• High gap fill</li><li>• Structural strengths</li><li>• High impact strength</li><li>• Able to cut through surface contaminants</li></ul>	<ul style="list-style-type: none"><li>• Fast fixture speed</li><li>• High adhesion to most materials</li><li>• Light cure available</li></ul>	<ul style="list-style-type: none"><li>• Room temperature cure</li><li>• High gap fill</li><li>• Excellent temperature resistance</li><li>• Wide variety of formulations</li></ul>	<ul style="list-style-type: none"><li>• Fast fixture speed</li><li>• Low volumetric cost</li><li>• Many types of hot melts offer a wide range of performance</li></ul>	<ul style="list-style-type: none"><li>• Excellent strength on metals</li><li>• High toughness</li><li>• High temperature</li><li>• High chemical resistance</li><li>• One-part</li></ul>	<ul style="list-style-type: none"><li>• High gap filling</li><li>• Improved strength over silicones</li><li>• No primer needed</li><li>• Isocyanate-free</li><li>• Solvent-free</li><li>• Paintable</li></ul>
Key Considerations		<ul style="list-style-type: none"><li>• Separate dispensing of activator</li><li>• Some activators contain solvents</li><li>• Fully cured in 24 hours</li></ul>	<ul style="list-style-type: none"><li>• Long cure time</li><li>• Will cure in mix tip during idle times</li><li>• May have strong odor</li><li>• May have flammable vapors</li></ul>	<ul style="list-style-type: none"><li>• Limited gap fill</li><li>• Low temperature resistance</li><li>• Durability may be affected by substrate corrosion</li></ul>	<ul style="list-style-type: none"><li>• Long cure times</li><li>• Adhesive cures in mix tip</li><li>• Limited adhesion to plastics and elastomers</li><li>• Equipment needed for bulk dispensing</li></ul>	<ul style="list-style-type: none"><li>• May have poor adhesion to metals</li><li>• Dispensing equipment required</li><li>• Hot dispense point can be a safety concern</li></ul>	<ul style="list-style-type: none"><li>• Requires heat to cure</li><li>• Requires ovens or induction curing equipment</li></ul>	<ul style="list-style-type: none"><li>• Limited temperature</li><li>• Performance</li><li>• Moderate cohesive strength</li></ul>
Performance								
Adhesive to Substrates	Metals	Excellent	Excellent	Very Good	Excellent	Good	Excellent	Good
	Plastics	Fair	Very Good	Excellent	Fair	Very Good	Good	Fair
	Paper	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Good
Gap Fill	Ideal	0.002" to 0.004"	0.004" to 0.006"	0.001" to 0.003"	0.004" to 0.006"	0.002" to 0.005"	0.002" to 0.004"	0.001" to 0.125"
	Max.	0.040"	>0.50"	0.010"	>0.50"	0.25"	0.49"	0.24"
Temperature Resistance	Typical Range	-65°F to 300°F (-54°C to 149°C)	-65°F to 300°F (-54°C to 149°C)	-65°F to 180°F (-54°C to 82°C)	-65°F to 300°F (-54°C to 149°C)	-65°F to 250°F (-54°C to 121°C)	-65°F to 302°F (-54°C to 150°C)	-40°F to 199°F (-40°C to 93°C)
	Max.	400°F (204°C)	400°F (204°C)	250°F (121°C)	400°F (204°C)	330°F (165°C)	302°F (150°C)	199°F (93°C)
Processing								
Fixture Time	Average	30 to 60 seconds	15 to 30 minutes	20 to 30 seconds	20 to 30 minutes	30 seconds	1 to 2 hours @ 120°C	15 to 30 minutes
	Fastest	15 to 30 seconds	3 to 5 minutes	5 to 10 seconds	3 to 5 minutes	5 to 10 seconds	60 seconds (induction)	5 minutes
Full Cure		24 hours	24 hours	24 hours	24 hours	24 hours	1 to 2 hours @ 120°C	1 to 7 days
Equipment Required		No	Two-part dispensing	No	Two-part dispensing	Hot melt dispenser	Oven or induction curing	One-part cartridge dispense gun
LOCTITE® BRAND PRODUCTS		<ul style="list-style-type: none"><li>• 331™ – Acid-Free</li></ul>	<ul style="list-style-type: none"><li>• H4500™ – Metal Bonding</li><li>• H8000™ – High Impact</li><li>• H8600™ – Severe Environment</li></ul>	<ul style="list-style-type: none"><li>• 4311™ – Toughened, UV Cure</li><li>• 4203™ – Low Viscosity, Toughened, High Temperature</li><li>• 4204™ – Mid-Viscosity, Toughened, High Temperature</li><li>• 4205™ – Gel, Toughened, High Temperature</li></ul>	<ul style="list-style-type: none"><li>• E-20HP™ – High Impact</li><li>• E-05MR™ – Fast, Moisture Resistant</li><li>• E-40HT™ – High Temperature</li><li>• E-30UT™ – Ultra Tough</li><li>• U-05FL™ – Fast, High Strength</li></ul>	<ul style="list-style-type: none"><li>• 7804FRM-HV™ – Flame Retardant</li><li>• 3631™ – High Strength PUR</li><li>• 0450™ – Extended Open Time</li><li>• 7901™ – Potting</li></ul>	<ul style="list-style-type: none"><li>• E-214HP™ – Toughened, High Adhesion</li><li>• E-220IC™ – Induction Cure for Fast Throughput</li></ul>	<ul style="list-style-type: none"><li>• Terostat® MS 939™ – High Elongation and Strength</li><li>• 5512™ – High Elongation and Strength</li></ul>

For additional information on the Loctite® products listed, please refer to the product selector in the back of this guide or visit [www.loctite.com/datasheets](http://www.loctite.com/datasheets).





## TYPICAL APPLICATIONS



MAGNET SEGMENTS  
TO HOUSING



RING MAGNETS  
TO ROTOR



MAGNET  
SEGMENTS  
TO ROTOR

## OVERVIEW

Magnets in electric motors are almost exclusively assembled today using adhesives. While a handful of different adhesive technologies are employed to meet the unique challenges of each specific motor's performance and processing requirements, it is widely accepted that adhesives create a higher quality joint at a lower cost than mechanical fasteners such as clips and bolts.

*The key benefits of adhesives over clips and bolts are:*

- Lower cost components
- Decreased inventory cost
- Easier to automate
- Will not chip magnets
- Prevent vibrational noise
- Prevent corrosion

## ADHESIVE TYPE COMPARISON

In general, any of these adhesives can achieve bond strengths that exceed the tensile or compressive strength of the magnet. As a result, the key performance attributes that typically differentiate these adhesive types are:

- Cure speed
- Gap fill
- Temperature resistance
- Impact strength

*Table 2* compares and contrasts the most commonly used types of adhesives for magnet bonding.

TABLE 2. COMPARISON OF ADHESIVE TYPES FOR BONDING MAGNETS

ATTRIBUTE		ACRYLIC, TWO-STEP	ACRYLIC, EXTERNAL MIX	EPOXY, ONE-PART HEAT CURE	EPOXY, ONE-PART INDUCTION CURE
OVERVIEW					
Key Benefits		<ul style="list-style-type: none"><li>• Fast fixture speed</li><li>• Long open time</li><li>• No mixing</li><li>• High impact strength</li><li>• Excellent temperature resistance</li><li>• Acid-free</li></ul>	<ul style="list-style-type: none"><li>• Fast fixture speed</li><li>• No liquid activator</li><li>• No static mix tips</li><li>• Single step</li><li>• Good gap fill</li><li>• Acid-free</li><li>• Robust mix ration</li></ul>	<ul style="list-style-type: none"><li>• Single component</li><li>• High gap fill</li><li>• Excellent temperature resistance</li><li>• Fully cured in one hour</li><li>• Acid-free</li></ul>	<ul style="list-style-type: none"><li>• Single component</li><li>• High gap fill</li><li>• Excellent temperature resistance</li><li>• Fully cured in one minute</li><li>• Acid-free</li></ul>
	Key Considerations	<ul style="list-style-type: none"><li>• Some activators contain solvents</li><li>• Fully cured in 24 hours</li><li>• Separate dispensing of activator</li></ul>	<ul style="list-style-type: none"><li>• 60- to 90-second open time</li><li>• Dispense location difficult to control on small magnets</li><li>• Fully cured in 24 hours</li><li>• External mix valve equipment required</li></ul>	<ul style="list-style-type: none"><li>• Must allow parts to cool</li><li>• Curing equipment required</li></ul>	<ul style="list-style-type: none"><li>• Must allow parts to cool</li><li>• Curing equipment with part-specific coils required</li></ul>
PERFORMANCE					
Gap Fill	Ideal	0.002" to 0.004"	0.002" to 0.006"	0.004" to 0.006"	0.004" to 0.006"
	Maximum	0.040"	0.200"	>0.50"	>0.50"
Temperature Resistance	Typical Range	-65°F to 300°F (-54°C to 149°C)	-65°F to 310°F (-54°C to 155°C)	-65°F to 350°F (-54°C to 176°C)	-65°F to 350°F (-54°C to 176°C)
	Maximum	400°F (204°C)	310°F (155°C)	400°F (204°C)	400°F (204°C)
Impact Strength (Steel)		Excellent	Excellent	Good	Good
PROCESSING					
Fixture Time	Average	30 to 60 seconds	1 to 10 minutes	30 to 45 minutes	30 to 60 seconds
	Fastest	15 to 30 seconds	30 to 60 seconds	15 to 30 minutes	30 seconds
Full Cure		24 hours	24 hours	1 hour	Permanent upon cooling
LOCTITE® BRAND PRODUCTS		<ul style="list-style-type: none"><li>• 331™ – Acid-Free</li><li>• 392™ – High Impact</li><li>• 334™ – High Moisture Resistance</li></ul>	<ul style="list-style-type: none"><li>• 3060™ – General-Purpose</li><li>• A-671™ – Humidity Resistance</li><li>• A-6750™ – Large Gap Fill</li></ul>	<ul style="list-style-type: none"><li>• E-214HP™ – High Strength</li></ul>	<ul style="list-style-type: none"><li>• E-220IC™ – General-Purpose*</li></ul>

For additional information on the Loctite® products listed, please refer to the product selector in the back of this guide or visit [www.loctite.com/datasheets](http://www.loctite.com/datasheets).

\* Can be used with stainless steel and aluminum but will require additional induction time to achieve the required temperature profile.



TYPICAL APPLICATIONS

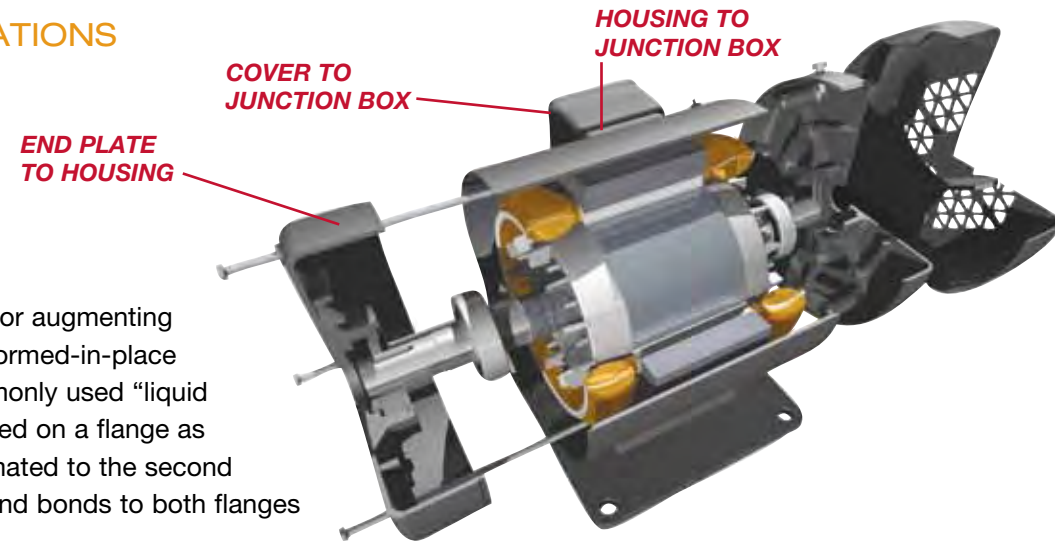
OVERVIEW

Henkel has been replacing or augmenting cut gaskets for decades. Formed-in-place gaskets are the most commonly used “liquid gaskets.” They are dispensed on a flange as liquid. When the flange is mated to the second flange, the liquid hardens and bonds to both flanges forming a seal.

*They offer the following benefits over cut gaskets, molded gaskets, and o-rings:*

- Easy to automate
- No misaligned gaskets
- One adhesive can seal many different flange configurations
- Lower inventory costs
- Lower labor costs
- Lower machining costs
- No gasket creep
- No gasket compression set

When it is necessary to service the gasketed assembly, cured-in-place gaskets can be used. They are robotically dispensed on a flange as a liquid and cured with light or heat. The cured gasket forms a compression gasket that is bonded to one flange. Cured-in-place gaskets share all the same benefits as formed-in-place gaskets, with the exception that cured-in-place gaskets are susceptible to compression set.



ADHESIVE TYPE  
COMPARISON

Formed-in-place gaskets can be created with anaerobic or silicone adhesives and are well-suited for manual, semi-automated, and fully automated processes. Anaerobic gaskets are generally used on rigid metal flanges. Silicones are better suited for flexible joints with higher gaps.

When comparing the light cure and heat cure silicones for cured-in-place gaskets, the light cure silicones have the shortest cure time and the least work-in-process, while the heat cure silicones offer higher adhesion, better thermal and chemical resistance, and lower volumetric cost.

**Table 3** compares and contrasts the most commonly used types of adhesives for gasketing.

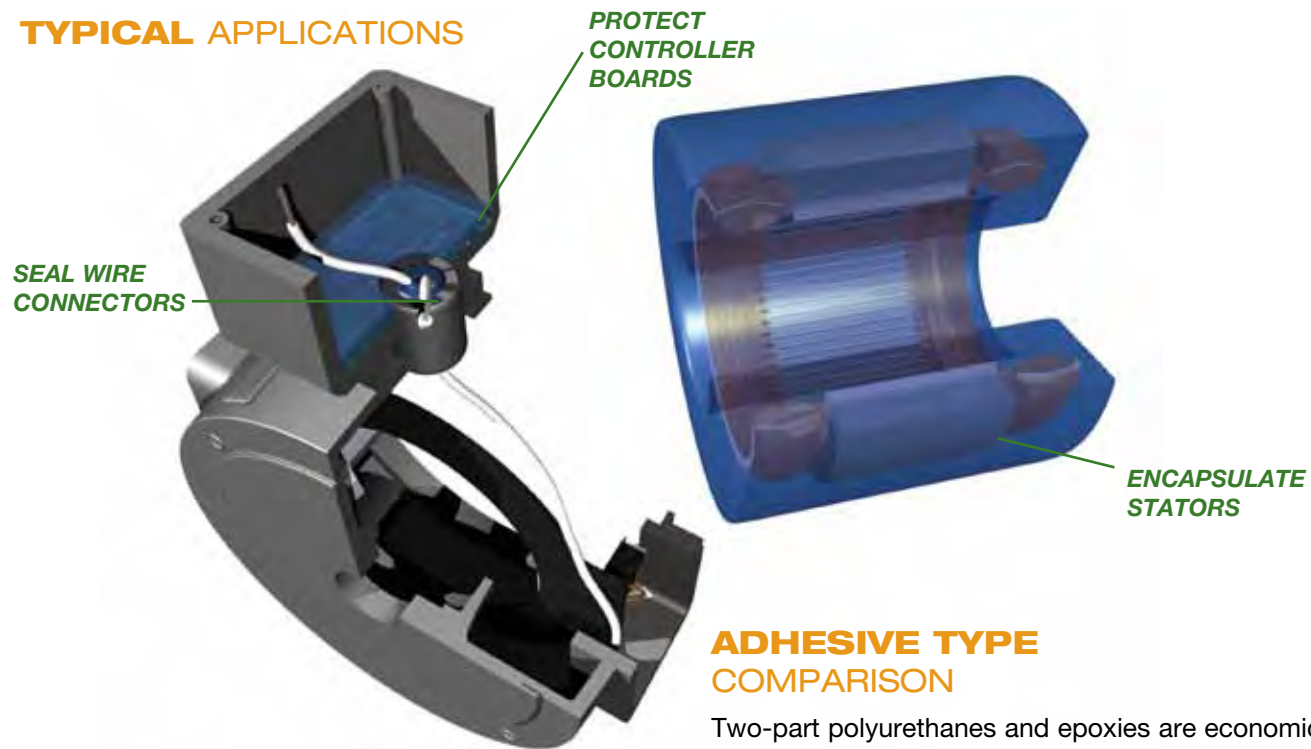
TABLE 3. COMPARISON OF ADHESIVE TYPES FOR GASKETING

ATTRIBUTE		FORMED-IN-PLACE		CURED-IN-PLACE		
		ANAEROBIC	SILICONE, RTV	SILICONE, LIGHT CURE	SILICONE, HEAT CURE	SILICONE, TWO-PART
OVERVIEW						
Key Benefits		<ul style="list-style-type: none"><li>• No compression set</li><li>• Adds structural strength</li><li>• High pressure seal</li></ul>	<ul style="list-style-type: none"><li>• No compression set</li><li>• High joint movement</li><li>• High gap fill</li><li>• High temperature resistance</li></ul>	<ul style="list-style-type: none"><li>• Serviceable</li><li>• Fastest cure time</li><li>• Immediate properties</li><li>• High gap fill</li></ul>	<ul style="list-style-type: none"><li>• Serviceable</li><li>• Excellent temperature resistance</li><li>• Excellent adhesion</li><li>• High gap fill</li></ul>	<ul style="list-style-type: none"><li>• Fast room temperature cure</li><li>• Oil resistant</li><li>• High adhesion</li><li>• Noncorrosive</li></ul>
Key Considerations		<ul style="list-style-type: none"><li>• Metal flanges only</li><li>• Rigid flanges only</li></ul>	<ul style="list-style-type: none"><li>• Limited open time</li><li>• Not for high pressure applications</li></ul>	<ul style="list-style-type: none"><li>• Must have dispensing and curing equipment</li><li>• Not for high pressure applications</li></ul>	<ul style="list-style-type: none"><li>• Must have dispensing and curing equipment</li><li>• Not for high pressure applications</li></ul>	<ul style="list-style-type: none"><li>• Two-component</li><li>• Short static mix nozzle life</li><li>• Requires two-part dispense equipment</li></ul>
PERFORMANCE						
Flange Type		Rigid	Rigid or Flexible	Rigid or Flexible	Rigid or Flexible	Rigid or Flexible
Suitable for Use With	Metals	Yes	Yes	Yes	Yes	Yes
	Plastics	No	Yes	Yes	Yes	Yes
Gap Fill	Ideal	0.001" to 0.005"	0.004" to 0.006"	0.020" to 0.060"	0.020" to 0.060"	0.002" to 0.006"
	Maximum	0.020"	0.25"	0.125"	0.125"	0.24"
Temperature Resistance	Typical Range	-65°F to 300°F (-54°C to 149°C)	-65°F to 400°F (-54°C to 204°C)	-65°F to 350°F (-54°C to 176°C)	-65°F to 400°F (-54°C to 204°C)	-40°F to 450°F (-40°C to 232°C)
	Maximum	400°F (204°C)	600°F (315°C)	400°F (204°C)	600°F (315°C)	450°F (232°C)
PROCESSING						
Cure Speed	Initial Cure	15 to 30 minutes	15 to 30 minutes	15 to 30 seconds	15 to 30 minutes	<10 minutes
	Full Cure	24 hours	24 hours to 7 days	24 hours to 7 days	15 to 30 minutes	24 hours
Manual Dispensing		Yes	Yes	No	No	No
LOCTITE® BRAND PRODUCTS		<ul style="list-style-type: none"><li>• 518™ – General-Purpose</li><li>• 510™ – High Temperature</li><li>• 509™ – Flexible</li><li>• 574™ – High Gap</li><li>• 573™ – Extended Open Time</li></ul>	<ul style="list-style-type: none"><li>• 5910™ – General-Purpose</li><li>• 5900™ – Instant Seal</li><li>• 5699™ – High Durometer</li><li>• 5920™ – High Temperature</li></ul>	<ul style="list-style-type: none"><li>• 5050™ – General-Purpose</li><li>• 5039™ – Dual Cure</li><li>• 5950™ – Fast Cure / Black</li><li>• 5951™ – Fast Cure / Clear</li></ul>	<ul style="list-style-type: none"><li>• 5964™ – General-Purpose</li><li>• 5963™ – High Durometer</li></ul>	<ul style="list-style-type: none"><li>• 5613™ – Oil-Resistant</li></ul>

For additional information on the Loctite® products listed, please refer to the product selector in the back of this guide or visit [www.loctite.com/datasheets](http://www.loctite.com/datasheets).



## TYPICAL APPLICATIONS



## ADHESIVE TYPE COMPARISON

### OVERVIEW

Potting is used to seal motors from solvent and moisture ingress and to protect critical components, such as controller boards, from mechanical damage and degradation caused by thermal cycling, vibration, and impact. To accomplish this, an enclosure is normally filled with adhesive, completely encapsulating critical components and sealing the aperture. Potting is essential in explosion-proof motors and wash-down motors.

Two-part polyurethanes and epoxies are economical solutions that offer room temperature curing with unlimited cure-through depths. As a result, they are often used when potting large volumes. Epoxies generally offer better thermal and solvent resistance than urethanes, while urethanes are lower in cost and have higher flexibility. One-part heat-cure epoxies perform similarly to two-part epoxies but typically have better adhesion to plastics and are fully cured in an hour.

Light curing acrylics and light curing silicones are normally used for shallow potting applications. These chemistries offer much faster processing speeds, but at a higher volumetric cost.

**Table 4** compares and contrasts the most commonly used types of adhesives for potting applications.

**TABLE 4. COMPARISON OF ADHESIVE TYPES FOR POTTING**

ATTRIBUTE	ACRYLIC, LIGHT CURE	EPOXY, ONE-PART HEAT CURE	EPOXY, TWO-PART	SILICONE, LIGHT CURE	SILICONE, TWO-PART	URETHANE, TWO-PART
<b>OVERVIEW</b>						
<b>Key Benefits</b>	<ul style="list-style-type: none"> <li>Fast fixture</li> <li>Fast full cure</li> <li>Good adhesion</li> </ul>	<ul style="list-style-type: none"> <li>High gap fill</li> <li>Excellent temperature resistance</li> <li>Fully cured in one hour</li> </ul>	<ul style="list-style-type: none"> <li>High thermal resistance</li> <li>High chemical resistance</li> <li>Excellent adhesion</li> <li>UL 1446 recognized</li> </ul>	<ul style="list-style-type: none"> <li>Fast fixture speed</li> <li>Flexible</li> <li>Excellent chemical resistance to polar solvents</li> <li>Good temperature resistance</li> </ul>	<ul style="list-style-type: none"> <li>Ultra clear</li> <li>Moderate to re-enterable gels available</li> <li>Room temperature cure</li> </ul>	<ul style="list-style-type: none"> <li>Low cost</li> <li>Flexible</li> <li>Excellent UV resistance</li> </ul>
<b>Key Considerations</b>	<ul style="list-style-type: none"> <li>Light source required</li> <li>Shadowed areas may not cure</li> <li>Low gap fill</li> </ul>	<ul style="list-style-type: none"> <li>Curing equipment required</li> <li>Long cure times</li> <li>Must allow parts to cool</li> </ul>	<ul style="list-style-type: none"> <li>Must be mixed</li> <li>Long cure time</li> </ul>	<ul style="list-style-type: none"> <li>Light source required</li> <li>Limited adhesion</li> <li>May contaminate painting processes</li> <li>Some formulations may cause corrosion</li> </ul>	<ul style="list-style-type: none"> <li>Two-part – requires mixing</li> <li>Catalyst is sensitive to metals</li> <li>Slow gel time</li> </ul>	<ul style="list-style-type: none"> <li>Must be mixed</li> <li>Long cure time</li> <li>Moisture contamination during processing</li> <li>Must handle isocyanates</li> </ul>
<b>PERFORMANCE</b>						
<b>Adhesive to Substrates</b>	<b>Metals</b>	Good	Excellent	Excellent	Good	Good
	<b>Plastics</b>	Excellent	Good	Good	Fair	Very Good
	<b>Paper</b>	Excellent	Excellent	Excellent	Good	Good
<b>Gap Fill</b>	<b>Ideal</b>	0.020" to 0.125"	0.050" to 0.25"	0.050" to 0.25"	0.020" to 0.125"	0.050" to 0.125"
	<b>Maximum</b>	0.250"	>0.50"	>0.50"	0.250"	0.49"
<b>Glass Transition Temperature (Tg)</b>		86°F to 176°F (30°C to 80°C)	122°F to 194°F (50°C to 90°C)	122°F to 194°F (50°C to 90°C)	<-40°F (<-40°C)	<-40°F (<-40°C)
<b>Temperature Resistance</b>	<b>Typical Range</b>	-65°F to 300°F (-54°C to 149°C)	-65°F to 300°F (-54°C to 149°C)	-65°F to 300°F (-54°C to 149°C)	-65°F to 350°F (-54°C to 176°C)	-67°F to 302°F (-55°C to 150°C)
	<b>Maximum</b>	350°F (176°C)	400°F (204°C)	400°F (204°C)	400°F (204°C)	392°F (200°C)
<b>PROCESSING</b>						
<b>Fixture Time</b>	<b>Average</b>	30 seconds	30 to 45 minutes	30 minutes	45 seconds	20 to 120 minutes
	<b>Fastest</b>	5 to 10 seconds	15 to 30 minutes	5 to 10 minutes	30 seconds	20 minutes
<b>Full Cure</b>		30 seconds	1 hour	24 hours	24 to 72 hours	24 hours
<b>Equipment Required</b>		Light source	Cure oven	Two-part dispense equipment	Light source	Two-part dispensing, oven
<b>LOCTITE® BRAND PRODUCTS</b>						
<ul style="list-style-type: none"> <li>3101™ – Multi-Cure</li> <li>366™ – UV + Activator</li> </ul>		<ul style="list-style-type: none"> <li>3335™ – UV Initiation</li> <li>3981™ – General-Purpose</li> <li>3982™ – Medium Viscosity</li> <li>3985™ – High Viscosity</li> </ul>	<ul style="list-style-type: none"> <li>193124 / 193125 – UV Dual Cure</li> <li>E-60NC™ – General-Purpose</li> <li>3140™ / 3164™ – UL 1446 &amp; UL 94 HB</li> <li>3145™/3162™ – UL 94 V-0</li> <li>E-40EXP™ – UL 1203</li> </ul>	<ul style="list-style-type: none"> <li>5240™ – Dual Cure</li> <li>5055™ – Flowable</li> <li>5056™ – High Adhesion</li> </ul>	<ul style="list-style-type: none"> <li>5620™ – Fast Cure</li> <li>5623™ – Tack-Free Gel</li> <li>5625™ – Soft Gel</li> <li>5611™ F – Fast, UL 94 V-0</li> <li>5611™ S – Slow, UL 94 V-0</li> </ul>	<ul style="list-style-type: none"> <li>3364™ – Very Fast, UL 94 V-0</li> <li>3173™ / 3182™ – Fast Cure</li> <li>3173™ / 3183™ – General-Purpose</li> <li>3173™ / 3184™ – UL 94 V-0</li> </ul>

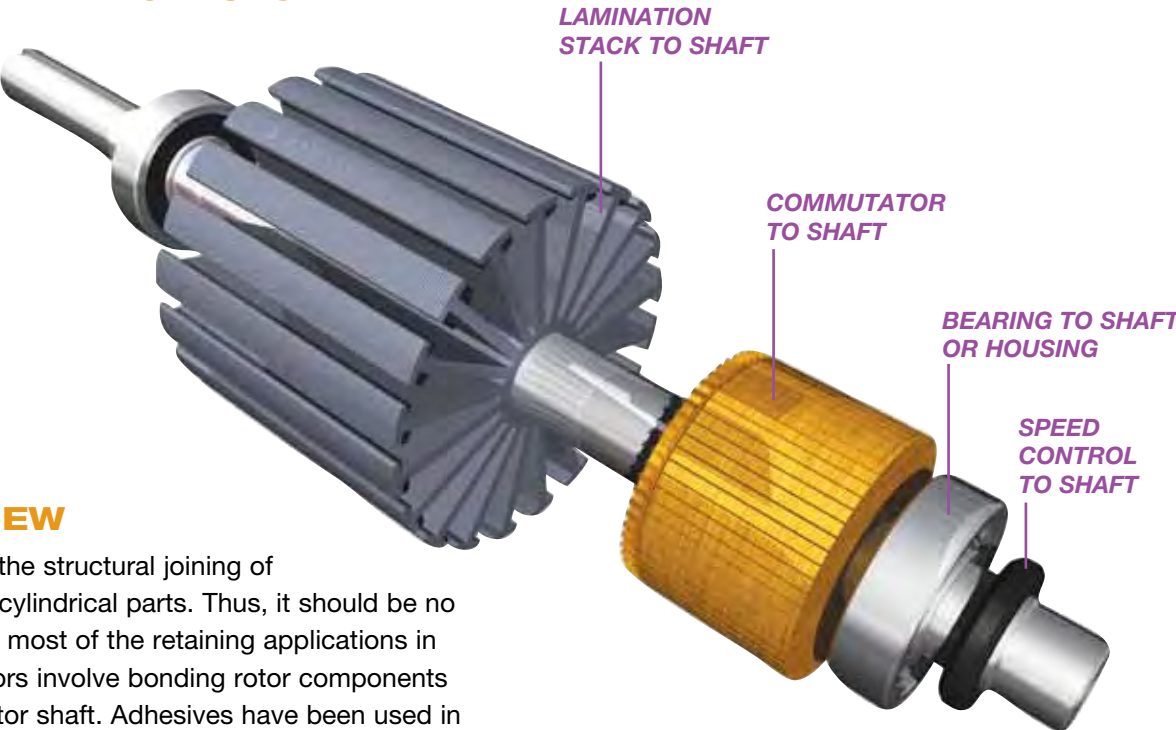
For additional information on the Loctite® products listed, please refer to the product selector in the back of this guide or visit [www.loctite.com/datasheets](http://www.loctite.com/datasheets).







TYPICAL APPLICATIONS



OVERVIEW

Retaining is the structural joining of close-fitting cylindrical parts. Thus, it should be no surprise that most of the retaining applications in electric motors involve bonding rotor components onto the motor shaft. Adhesives have been used in electric motors for decades to augment or replace frictional methods, such as press and shrink fits, and mechanical methods, such as splines, keys, and locking pins.

The key benefits of adhesives over alternative methods are:

- Lower cost components
- Lower energy costs
- Easier to automate
- Eliminate wallowing and backlash of mechanical fits
- Eliminate run-out and warping of shaft
- Prevent fretting corrosion
- Prevent galvanic corrosion

ADHESIVE TYPE  
COMPARISON

Anaerobic adhesives are the dominant adhesive chemistry for metal-to-metal retaining applications. Anaerobics are single component and high strength, with a rapid cure at room temperature. When used with primers, they can achieve fixture times of less than 10 seconds.

When plastic components require retaining, cyanoacrylate adhesives are often used.

Table 5 compares and contrasts anaerobics for retaining.

TABLE 5. COMPARISON OF ADHESIVE TYPES FOR RETAINING

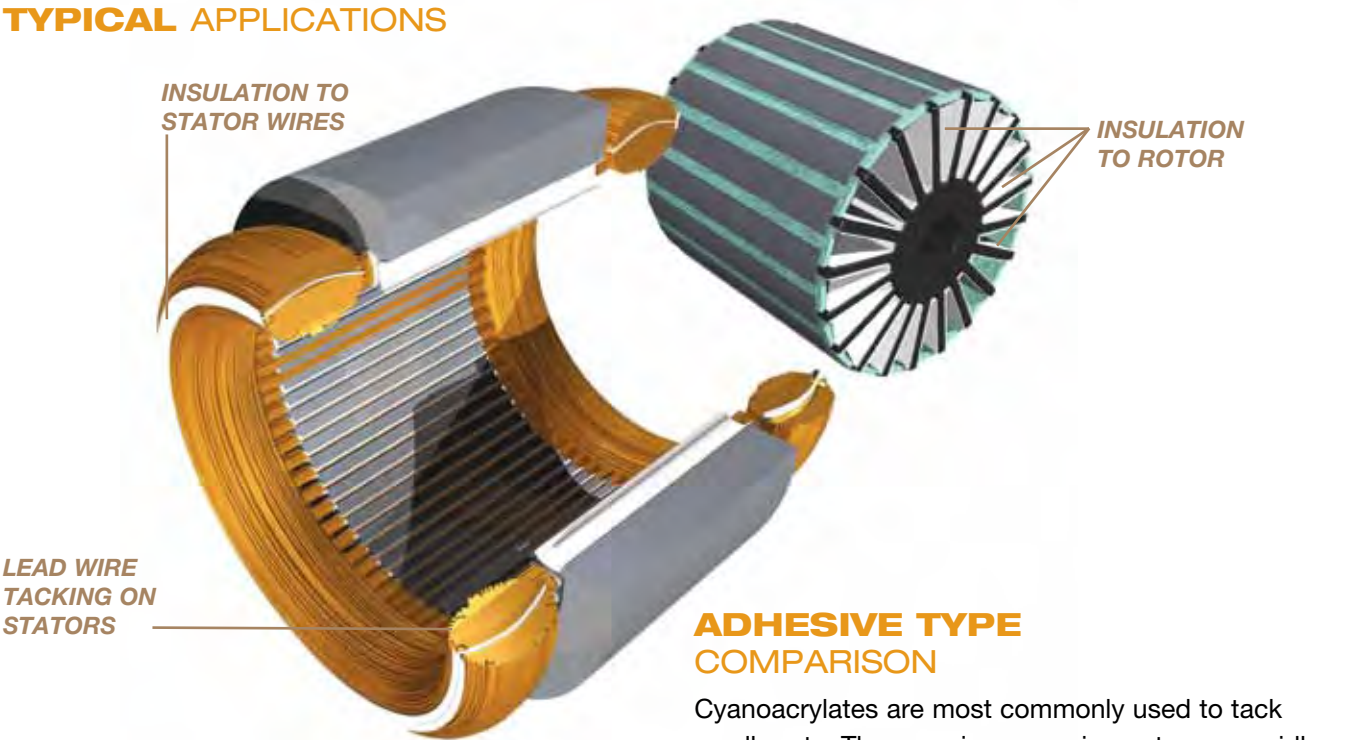
ATTRIBUTE		ANAEROBIC	
		LIQUID	SEMISOLID STICK
OVERVIEW			
Key Benefits		<ul style="list-style-type: none"><li>• High strength</li><li>• Excellent chemical resistance</li><li>• High temperature resistance</li><li>• Light cure available</li></ul>	<ul style="list-style-type: none"><li>• Semisolid form</li><li>• Will not drip or migrate</li><li>• High strength</li><li>• High thermal and chemical resistance</li></ul>
Key Considerations		<ul style="list-style-type: none"><li>• Cannot be used with plastics</li><li>• Cure speed highly dependent upon substrate</li><li>• May require use of activator</li></ul>	<ul style="list-style-type: none"><li>• Cannot be used with plastics</li><li>• Cure speed highly dependent upon substrate</li><li>• May require use of activator</li></ul>
PERFORMANCE			
Shear Strength (Steel)		3,000 to 4,000 psi	3,000 to 4,000 psi
Suitable for Use With	Metals	Yes	Yes
	Plastics	No	No
Gap Fill	Ideal	0.001" to 0.003"	0.001" to 0.003"
	Maximum	0.010"	0.005"
Temperature Resistance	Typical Range	-65°F to 300°F (-54°C to 149°C)	-65°F to 300°F (-54°C to 149°C)
	Maximum	400°F (204°C)	400°F (204°C)
PROCESSING			
Fixture Time	Average	5 to 10 minutes	30 minutes
	Fastest	5 minutes – unprimed <10 seconds – primed	30 minutes – unprimed <1 minute – primed
Full Cure		24 hours	24 hours
LOCTITE® BRAND PRODUCTS		<ul style="list-style-type: none"><li>• 603™ – General-Purpose</li><li>• 648™ – Fast Cure</li><li>• 620™ – High Temperature</li><li>• 638™ – High Strength</li><li>• 290™ – Wicking Grade</li><li>• 661™ – Light Cure</li></ul>	<ul style="list-style-type: none"><li>• 668™ – General-Purpose</li></ul>

For additional information on the Loctite® products listed, please refer to the product selector in the back of this guide or visit [www.loctite.com/datasheets](http://www.loctite.com/datasheets).





TYPICAL APPLICATIONS



OVERVIEW

Tacking applications are bonding applications where the adhesive is used to fixture the assembly very quickly. Adhesives are commonly used to tack lead wires, individual wires, and insulation in electric motors. It is very common to tack lead wires and individual wires into position to reinforce them. Tacking is also used as a processing aid to ensure that the insulation on a motor or generator remains in the correct position until the entire assembly is unitized with varnish. This prevents electrical shorts caused by the insulation moving during subsequent operations, such as mechanical shaping of the stator wires in large motors and generators.

ADHESIVE TYPE  
COMPARISON

Cyanoacrylates are most commonly used to tack small parts. They require no equipment, cure rapidly at room temperature, achieve very high strengths to most substrates, and any excess can be quickly cured with accelerator or light.

Hot melt adhesives are normally used on larger parts due to their low volumetric cost. They have fast cure speed and good adhesion to most substrates, and can be sprayed from handheld applicators.

Light cure acrylic adhesives offer virtually unlimited positioning time with cure-on-command capability. If light can reach the joint, such as when wire tacking or through insulation paper, light cure is often the most user-friendly process.

*Table 6* compares and contrasts the most commonly used types of adhesives for tacking applications.

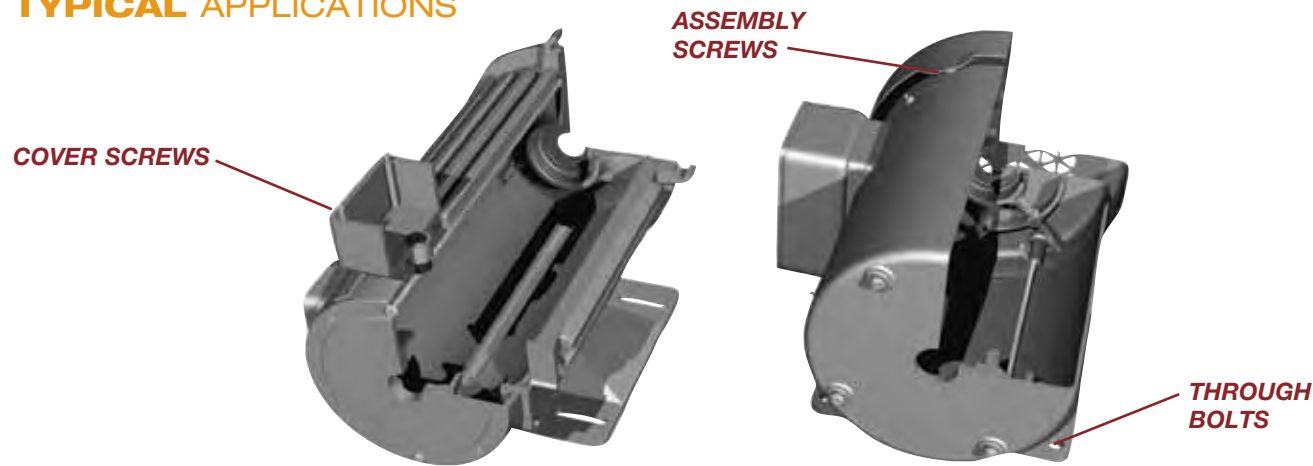
TABLE 6. COMPARISON OF ADHESIVE TYPES FOR TACKING

ATTRIBUTE		ACYRLIC, LIGHT CURE	CYANOACRYLATE	HOT MELT
OVERVIEW				
Key Benefits		<ul style="list-style-type: none"><li>• Fast fixture</li><li>• Fast full cure</li><li>• Good adhesion to metals, plastics, and paper</li></ul>	<ul style="list-style-type: none"><li>• Fast fixture</li><li>• High adhesion to most substrates</li><li>• No equipment required</li><li>• Light cure available</li></ul>	<ul style="list-style-type: none"><li>• Fast fixture</li><li>• Low volumetric cost</li><li>• Many types offer wide range of performance</li></ul>
	Key Considerations	<ul style="list-style-type: none"><li>• Light source required</li></ul>	<ul style="list-style-type: none"><li>• Low gap fill</li><li>• Low temperature resistance</li><li>• Durability may be affected by substrate corrosion</li></ul>	<ul style="list-style-type: none"><li>• May have poor adhesion to metals</li><li>• Dispensing equipment required</li><li>• Hot dispense point can be a safety concern</li></ul>
PERFORMANCE				
Adhesive to Substrates	Metals	Good	Very Good	Good
	Plastics	Excellent	Excellent	Very Good
	Paper	Excellent	Excellent	Excellent
Gap Fill	Ideal	0.002" to 0.010"	0.001" to 0.003"	0.002" to 0.005"
	Maximum	0.25"	0.010"	0.25"
Temperature Resistance	Typical Range	-65°F to 300°F (-54°C to 149°C)	-65°F to 180°F (-54°C to 82°C)	-65°F to 250°F (-54°C to 121°C)
	Maximum	350°F (176°C)	250°F (121°C)	330°F (165°C)
PROCESSING				
Fixture Time	Average	30 seconds	20 seconds	30 seconds
	Fastest	5 to 10 seconds	5 to 10 seconds	5 to 10 seconds
Full Cure		30 seconds	24 hours	<4 hours
Equipment Required		Light source	No	Hot melt dispenser
LOCTITE® BRAND PRODUCTS		<ul style="list-style-type: none"><li>• 3972™ – General-Purpose, Low cPs</li><li>• 3971™ – General-Purpose, Medium cPs</li><li>• 3944™ – High Adhesion to Metals</li><li>• 3926™ – High Adhesion to Plastics</li><li>• 3526™ – Activator Cure</li></ul>	<ul style="list-style-type: none"><li>• 4203™ – Low cPs - Thermally Resistant</li><li>• 4204™ – Medium cPs - Thermally Resistant</li><li>• 4205™ – Gel - Thermally Resistant</li><li>• 4311™ – Medium cPs - UV Cure</li><li>• 712™ – Accelerator - Isopropanol</li><li>• 7452™ – Accelerator - Acetone</li></ul>	<ul style="list-style-type: none"><li>• 7804FRM-HV™ – General-Purpose</li><li>• 3631™ – High Adhesion to Metals</li><li>• 0450™ – Long Open Time</li><li>• 7901™ – High Temperature</li></ul>

For additional information on the Loctite® products listed, please refer to the product selector in the back of this guide or visit [www.loctite.com/datasheets](http://www.loctite.com/datasheets).



TYPICAL APPLICATIONS



OVERVIEW

Threadlockers prevent the loosening of threaded fasteners by completely filling the space between the threads, hardening to a strong polymer and bonding to both sides. Various viscosities and strengths are available to accommodate all fastener sizes. Threadlockers have a long history of improving the performance and reliability of threaded assemblies versus other frictional methods such as lock washers or stop nuts.

The key benefits threadlockers offer are:

- Lower cost
- More effective at preventing loosening
- Simple processing
- Controlled strengths
- Prevent corrosion

ADHESIVE TYPE  
COMPARISON

Liquid anaerobic threadlockers are the most widely used method to prevent vibrational loosening of metal fasteners. The large line of Loctite® brand threadlockers offers a variety of viscosities, colors, strengths, and cure speeds.

Loctite® QuickStix™ are the most recent Henkel innovation. They offer the same performance as a liquid anaerobic threadlocker but in a semisolid stick. The stick form allows the threadlocker to be applied to a nut or screw in any orientation without drips, and ensures that excess adhesive will not migrate into the motor bearings or moving parts, which could cause reliability issues.

When threadlocking plastic fasteners or tamper-proofing the heads of screws, cyanoacrylate liquids are normally used. They rapidly cure in plastic joints and will not stress-crack most plastics.

Table 7 compares and contrasts the most commonly used types of threadlocking adhesives.

TABLE 7. COMPARISON OF ADHESIVE TYPES FOR THREADLOCKING

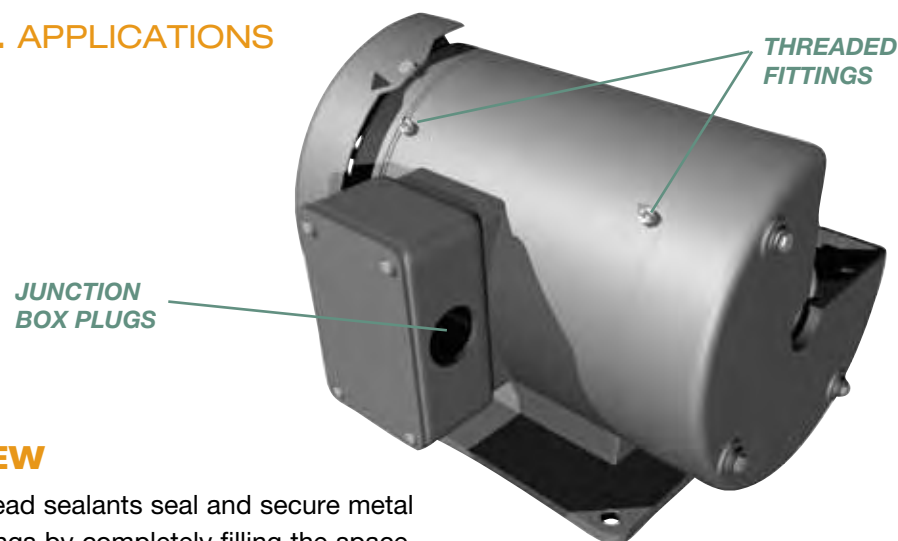
ATTRIBUTE		ANAEROBIC		CYANOACRYLATE
		LIQUID	SEMISOLID STICK	
OVERVIEW				
Key Benefits		<ul style="list-style-type: none"><li>• Controlled strengths</li><li>• Variety of viscosities</li><li>• Color-coded by strength</li><li>• High thermal and chemical resistance</li><li>• Can post-apply wicking grade products</li><li>• Wide variety of products available</li></ul>	<ul style="list-style-type: none"><li>• Semisolid form will not drip or migrate</li><li>• Controlled strengths</li><li>• Color-coded by strength</li><li>• High thermal and chemical resistance</li></ul>	<ul style="list-style-type: none"><li>• Compatible with plastics</li><li>• Fast cure</li></ul>
Key Considerations		<ul style="list-style-type: none"><li>• Not for use on plastics</li></ul>	<ul style="list-style-type: none"><li>• Not for use on plastics</li></ul>	<ul style="list-style-type: none"><li>• Low thermal and chemical resistance</li></ul>
PERFORMANCE				
Suitable for Use With	Metals	Yes	Yes	Yes
	Plastics	No	No	Yes
Temperature Resistance	Typical Range	-65°F to 300°F (-54°C to 149°C)	-65°F to 300°F (-54°C to 149°C)	-65°F to 180°F (-54°C to 82°C)
	Maximum	450°F (232°C)	300°F (149°C)	180°F (82°C)
PROCESSING				
Cure Speed	Fixture	5 to 10 minutes	10 to 20 minutes	1 to 2 minutes
	Full Cure	24 hours	24 hours	24 hours
LOCTITE® BRAND PRODUCTS		<ul style="list-style-type: none"><li>• 243™ – General-Purpose</li><li>• 222™ – Low Strength</li><li>• 2422™ – High Temperature</li><li>• 263™ – High Strength, Fast Set</li><li>• 290™ – Wicking Grade</li></ul>	<ul style="list-style-type: none"><li>• 248™ – General-Purpose</li><li>• 268™ – High Strength</li></ul>	<ul style="list-style-type: none"><li>• 425™ – Plastic Parts, Tamper-Proofing</li></ul>

For additional information on the Loctite® products listed, please refer to the product selector in the back of this guide or visit [www.loctite.com/datasheets](http://www.loctite.com/datasheets).





## TYPICAL APPLICATIONS



## OVERVIEW

Anaerobic thread sealants seal and secure metal pipes and fittings by completely filling the space between the threads and hardening to prevent leakage. They have additives that facilitate assembly and maintain controlled strength to allow for easy removal with basic hand tools. The cured product has excellent temperature and chemical resistance that is compatible with many of the most severe operating environments.

Anaerobic thread sealants have been replacing alternatives such as PTFE tape, pipe dope, and specialty fittings like dry seal fittings, flared fittings, compression fittings, and confined o-rings for decades.

*The advantages of anaerobic thread sealants over these methods are:*

- Lower cost fittings
- Easy to automate
- No solvents
- Will not shred and contaminate systems
- Easy assembly
- Corrosion protection

## ADHESIVE TYPE COMPARISON




Anaerobic thread sealants are the most widely used liquid products for sealing pipe fittings. The large line of Loctite® brand thread sealants offers a variety of viscosities, colors, strengths, and cure speeds.

Loctite® QuickStix™ are the most recent Henkel innovation. They offer the same performance as a liquid anaerobic thread sealant but in a semisolid stick. The stick form allows the thread sealant to be applied to a fitting in any orientation without drips and ensures that excess adhesive will not migrate into the motor housing or moving parts that could cause reliability issues.

When thread sealing plastic fittings, use Loctite® No More Leaks™, a solvent-based product, or Loctite® 55™ Pipe Sealing Cord.

*Table 8* compares and contrasts the most commonly used types of thread sealants.

TABLE 8. COMPARISON OF ADHESIVE TYPES FOR THREAD SEALING

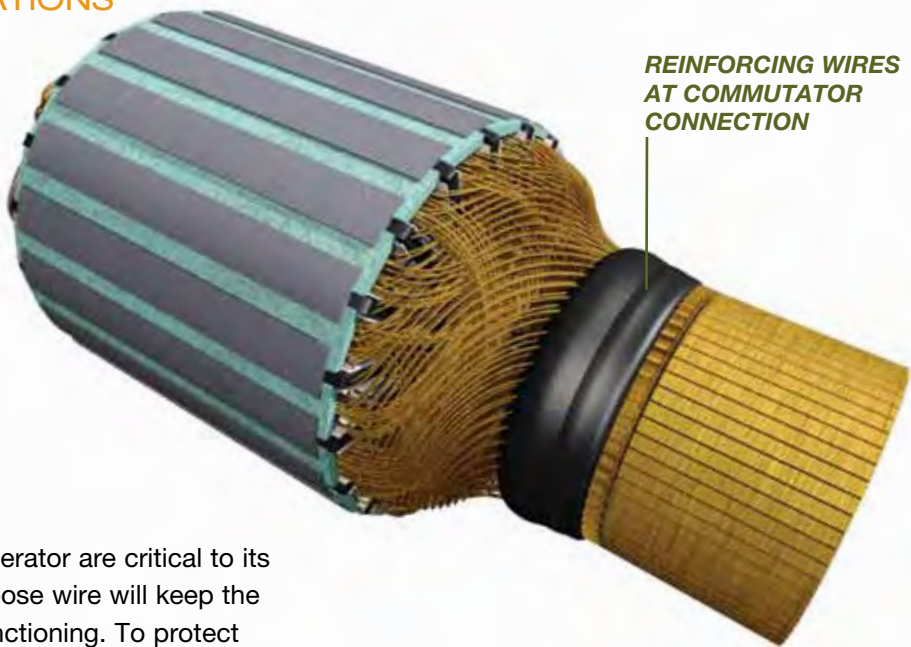
ATTRIBUTE		ANAEROBIC		NONREACTIVE
		LIQUID	SEMISOLID STICK	
OVERVIEW				
Key Benefits		<ul style="list-style-type: none"><li>• Controlled strengths</li><li>• Variety of viscosities</li><li>• High thermal and chemical resistance</li><li>• Wide variety of products available</li></ul>	<ul style="list-style-type: none"><li>• Semisolid form will not drip or migrate</li><li>• High thermal and chemical resistance</li></ul>	<ul style="list-style-type: none"><li>• Compatible with plastics</li></ul>
Key Considerations		<ul style="list-style-type: none"><li>• Not for use on plastics</li></ul>	<ul style="list-style-type: none"><li>• Not for use on plastics</li></ul>	<ul style="list-style-type: none"><li>• May contain solvents</li></ul>
PERFORMANCE				
Suitable for Use With	Metals	Yes	Yes	Yes
	Plastics	No	No	Yes
Temperature Resistance	Typical Range	-65°F to 300°F (-54°C to 149°C)	-65°F to 300°F (-54°C to 149°C)	-65°F to 300°F (-54°C to 149°C)
	Maximum	400°F (204°C)	300°F (149°C)	400°F (204°C)
PROCESSING				
Seals Operating Pressure		4 hours	4 hours	Instant
LOCTITE® BRAND PRODUCTS		<ul style="list-style-type: none"><li>• 565™ – General-Purpose</li><li>• 545™ – Hydraulic/Pneumatic</li><li>• 554™ – Refrigerant</li><li>• 567™ – High Temperature</li><li>• 592™ – Slow Cure</li></ul>	<ul style="list-style-type: none"><li>• QuickStix™ 561™ PST® – General-Purpose</li><li>• QuickStix™ 5671™ PST® – Stainless Steel</li></ul>	<ul style="list-style-type: none"><li>• 55™ Pipe Sealing Cord</li><li>• Thread Sealant for Oxygen Systems</li><li>• No More Leaks™ – Solvent-Based</li></ul>

For additional information on the Loctite® products listed, please refer to the product selector in the back of this guide or visit [www.loctite.com/datasheets](http://www.loctite.com/datasheets).





TYPICAL APPLICATIONS



OVERVIEW

The wires in a motor or generator are critical to its operation. One broken or loose wire will keep the motor or generator from functioning. To protect against wire breaks, manufacturers normally unitize the wires in rotors and stators with varnish. The solvent-based varnishes that are used may be sufficient for many applications, but do not offer enough protection for all applications. For example, it is very common to reinforce the wires that connect to the commutator in DC motors when the motor will be in service in high impact or vibration service environments, such as in power tools or in sink garbage disposals. In these applications, the thin coating of varnish on the wires that connect to the commutator does not offer sufficient reinforcement to prevent the flexing fatigue that can lead to failure. To reinforce these wires, a medium viscosity epoxy coating is applied that is thin enough to surround the wires, but thick enough to build up a rigid coating.

ADHESIVE TYPE  
COMPARISON

For high-volume production, one-part heat cure epoxies are often the optimum method for reinforcing wires. They are easy to process, have excellent electrical properties, and can normally be dispensed and cured in the varnish trickle cure oven. Since the epoxy coating is being cured in the varnish cure oven, it does not add any work-in-process or time-to-manufacture to the process and the equipment, and maintenance costs are very low. Two-part epoxies are generally used in work cells where it is desired to dispense the adhesive manually and allow it to cure at room temperature.

Table 9 compares and contrasts the most commonly used types of adhesives for wire reinforcement.

TABLE 9. COMPARISON OF ADHESIVE TYPES FOR WIRE REINFORCEMENT

ATTRIBUTE		EPOXY, ONE-PART HEAT CURE	EPOXY, TWO-PART
OVERVIEW			
Key Benefits		<ul style="list-style-type: none"><li>• Can cure adhesive in varnish cure oven</li><li>• No mixing required</li></ul>	<ul style="list-style-type: none"><li>• Room temperature cure</li><li>• Can accelerate cure with heat</li></ul>
Key Considerations		<ul style="list-style-type: none"><li>• Cool-down time after cure</li></ul>	<ul style="list-style-type: none"><li>• Adhesive cures in mix tip</li><li>• Adhesive waste due to pot life</li></ul>
PERFORMANCE			
Adhesive to Substrates	Metals	Excellent	Excellent
	Plastics	Good	Good
	Paper	Excellent	Excellent
Gap Fill	Ideal	0.050" to 0.100"	0.050" to 0.100"
	Maximum	>0.50"	>0.50"
Temperature Resistance	Typical Range	-65°F to 350°F (-54°C to 176°C)	-65°F to 300°F (-54°C to 149°C)
	Maximum	400°F (204°C)	400°F (204°C)
PROCESSING			
Fixture Time		30 to 60 minutes	20 to 30 minutes
Full Cure		1 hour	24 hours
LOCTITE® BRAND PRODUCTS		<ul style="list-style-type: none"><li>• 3985™ – General-Purpose</li></ul>	<ul style="list-style-type: none"><li>• E-40FL™ – General-Purpose</li><li>• E-20HP™ – High Impact</li><li>• E-05MR™ – Fast, Moisture Resistant</li></ul>

For additional information on the Loctite® products listed, please refer to the product selector in the back of this guide or visit [www.loctite.com/datasheets](http://www.loctite.com/datasheets).



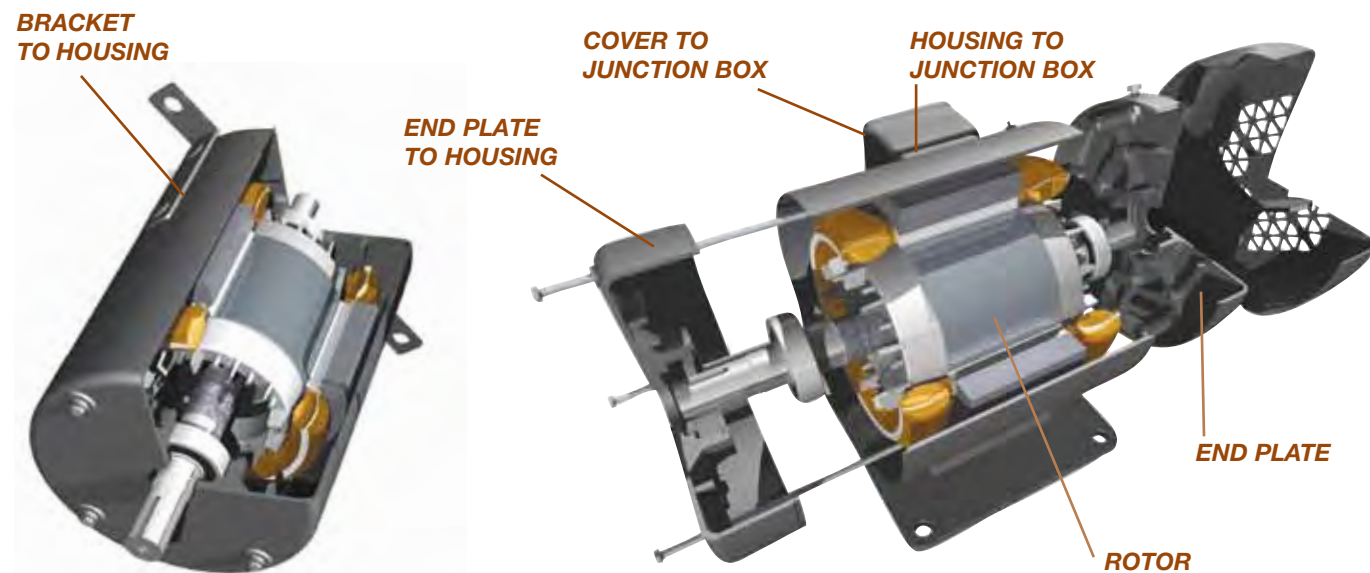


# ELECTRIC MOTOR

surface treatment applications

# SURFACE TREATMENT

## TYPICAL APPLICATIONS



## OVERVIEW

As the market and technology leader for metal pretreatments, autodeposition coatings, and metalworking fluids, Henkel has the technology, expertise, and support to improve your products and processes.

## METALWORKING

Henkel is continually improving its metalworking capabilities. Recent innovations include synthetic drawing fluids, biostatic coolants, and low VOC finishing lubricants.

Product Type	Leading Henkel Brands
Stamping Compounds	Multan® F, Multan® PL, Multan® DFL
Machining Coolants	Multan®, Multan® CR
Corrosion Preventatives	P3® Previnox™
In-Process Cleaners	P3® Neutracare®

## METAL PRETREATMENT

Recent Henkel innovations include:

- Bonderite® NT-1™, a nano-ceramic pretreatment
- A laser scale removal process
- Internally accelerated zinc phosphate coatings
- Dry-in-place conversion coatings
- Alodine® and Alodine® EC² for aluminum

### Bonderite® NT-1™

Bonderite® NT-1™ is an ambient temperature, phosphate-free pretreatment that creates a nano-ceramic coating on steel, zinc, and aluminum surfaces.

#### Benefits vs. Phosphate Pretreatment:

- Higher Performance – Innovative nanotechnology provides better edge definition and adhesion for paints. The corrosion resistance is better than iron phosphate.
- Lower Operating Cost – The waste treatment costs are virtually eliminated and the ambient coating process significantly reduces energy costs.
- Environmentally Responsible – The process is phosphate- and heavy metal-free with minimal waste treatment. It also complies with even the strictest municipal codes.
- Higher Throughput – The treatment time is faster, increasing production capacity.
- Maintenance-Free – There is virtually no sludge buildup in the tank.
- No Post-Treatment – Sealing is not required for exceptional corrosion resistance.
- Reliable – Simple, low maintenance process is easy to monitor and control.

Product Type	Leading Henkel Brands
Cleaners	Parco®, Deoxidine®, Ridoline®, P3®
Conversion Coatings	Prep-N-Cote®, Bonderite®, Alodine®
Post-Treatments	Parcolene®
Anodizing	Deoxidine®, Ridoline®, P3 Almeco®, Aluminux®, P3 Almecolor™, Spectrocolor®

## AUTODEPOSITION SURFACE COATINGS

Aquence® brand autodeposition coatings are a patented technology from Henkel. These coatings can be simpler, safer, faster, higher performance, and have a smaller process footprint when compared to alternative coatings. For more info on Autophoretic® brand coatings, please turn the page.

### Aquence®

Aquence® brand coatings are chemical coating processes where an organic polymeric emulsion of PVDC or epoxy is chemically deposited on the surface of a clean, metal substrate.

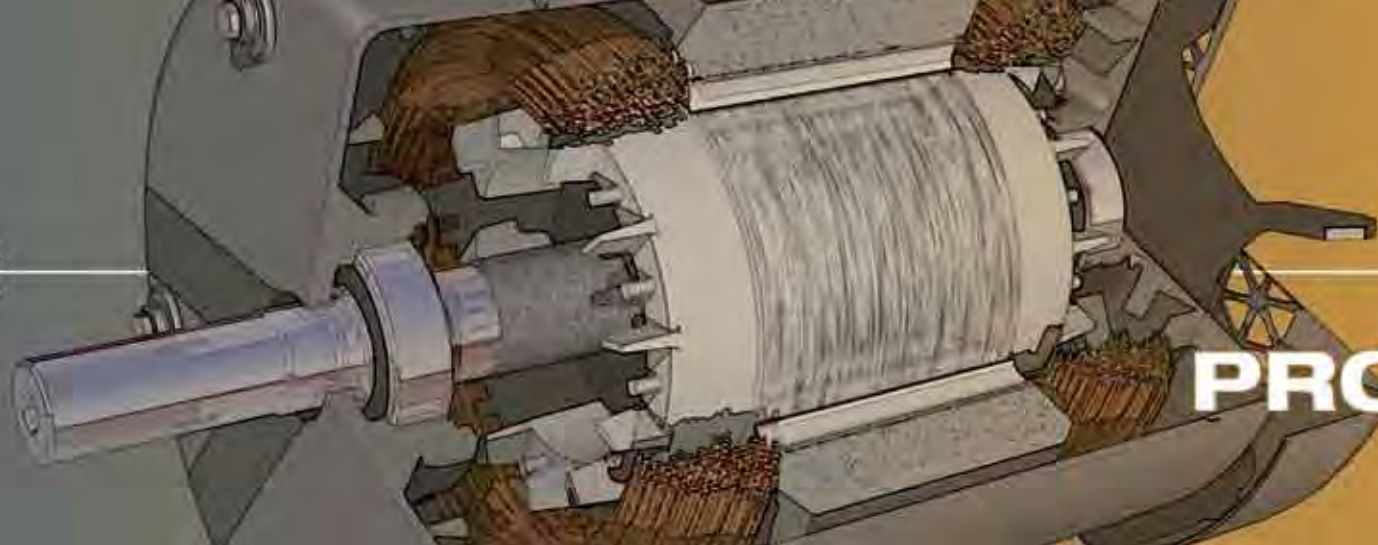
#### Benefits vs. Alternative Coatings:

- Higher Consistency – Extremely uniform coating thickness on all surfaces, including electrically shielded areas such as inner diameters of tubes.
- Up to 40% Smaller Footprint – The simple, four-stage process also allows for much higher rack density.
- No Pretreatment Required – No phosphate pretreatment is required to achieve exceptional corrosion resistance.
- Coat Entire Assemblies – The uniform coating that is created will not build up or bridge. This allows entire assemblies, even threaded assemblies, to be coated at once.
- User-Friendly – No rack masking or stripping is required.
- Reliable – Simple process is easy to monitor and control.
- Safer – Low or zero VOC water-based process does not require electricity.
- Fewer steps than conventional painting – less space/time.
- Coats only reactive metals (assemblies and R/M possible).

Product Type	Leading Henkel Brands
Cleaners, Coatings, and Reaction Rinses	Aquence®

Please contact Technical Services at Henkel Corporation for more information on our surface technologies.





PRODUCT SELECTOR

	CHEMISTRY	TYPICAL USE	PRODUCT NUMBER	# OF COMP.	CURE METHOD	COLOR	VISCOSITY (cP)	FIXTURE TIME	CURE-THROUGH DEPTH, IN.		TEMP. RANGE	PACKAGE SIZE – PART NUMBER					
GENERAL BONDING	ACRYLICS	Fast Cure, Acid-Free	331™	2	Activator	Cream	20,000	20 sec.	0.039		-65°F to 350°F (-54°C to 177°C)	25 ml syringe with manual plunger - 1057673	1 liter - 1057674	10 liter pail - 1062124	25 ml EFD syringe w/o manual plunger - 1256398		
		Metal Bonding	H4500™ Speedbonder™	2	Two-Part (10:1)	Pale Yellow	55,000	15 to 20 min.	>0.5		-65°F to 300°F (-54°C to 150°C)	50 ml dual cartridge (s style) - 996512	490 ml dual cartridge - 83041	Resin - 40 lb. pail - 83043* Hardener - 40 lb. pail - 83042*			
		High Impact	H8000™ Speedbonder™	2	Two-Part (10:1)	Green	150,000	15 to 20 min.	>0.5		-65°F to 300°F (-54°C to 150°C)	50 ml dual cartridge (s style) - 996453	490 ml dual cartridge - 36160	Resin - 35 lb. pail - 35939* Hardener - 45 lb. pail - 35940*	Resin - 55 gal. drum - 37009*		
		Severe Environment	H8600™ Speedbonder™	2	Two-Part (2:1)	Blue	90,000	55 min.	>0.5		-65°F to 400°F (-54°C to 204°C)	50 ml dual cartridge - 40875	400 ml dual cartridge - 38762	Resin - 40 lb. pail - 38760* Hardener - 45 lb. pail - 38761*	Resin - 425 lb. drum - 1010342* Hardener - 425 lb. drum - 1010333*		
	EPOXIES	High Impact	E-20HP™ Hysol®	2	Two-Part (2:1)	Off-White	45,000	60 min.	>0.5		-65°F to 400°F (-54°C to 204°C)	50 ml dual cartridge - 29314	200 ml dual cartridge - 29315	400 ml dual cartridge - 29316	Resin - 5 gal. pail - 29317* Hardener - 5 gal. pail - 29318*		
		Moisture Resistant	E-05MR™ Hysol®	2	Two-Part (1:1)	Ultra-Clear	25,000	15 min.	>0.5		-65°F to 250°F (-54°C to 121°C)	25 ml syringe with manual plunger - 1087601	50 ml dual cartridge - 1086598	200 ml dual cartridge - 1086600*	400 ml dual cartridge - 1086599*	Resin - 5 gal. pail - 1087602* Hardener - 5 gal. pail - 1087603*	
		High Temperature	E-40HT™ Hysol®	2	Two-Part (2:1)	Off-White	430,000	165 min.	>0.5		-65°F to 400°F (-54°C to 204°C)	50 ml dual cartridge - 1086065	400 ml dual cartridge - 1086081				
		Ultra Tough	E-30UT™ Hysol®	2	Two-Part (2:1)	Purple	12,200	180 min.	>0.5		-65°F to 300°F (-54°C to 150°C)	50 ml dual cartridge - 1078234	400 ml dual cartridge - 1078235				
		Toughened, High Adhesion	E-214HP™ Hysol®	1	One-Part Heat	Light Grey	Paste	2 hrs.	>0.5		-65°F to 300°F (-54°C to 150°C)	30 ml EFD syringe - 29339	300 ml cartridge - 29340	5 gal. pail - 29341			
		Induction Cure for Fast Throughput	E-220IC™ Hysol®	1	One-Part Heat/Induction	Grey	Paste	40 sec. (induction)	>0.5		-65°F to 300°F (-54°C to 150°C)	31 ml EFD syringe - 1078250	1 liter bottle - 1078261	5 gal. pail - 1078499			
	POLYURETHANES	Fast, High Strength	U-05FL™ Hysol®	2	Two-Part (1:2)	Off-White	100,000	15 min.	>0.5		-65°F to 250°F (-54°C to 121°C)	50 ml dual cartridge - 29348	200 ml dual cartridge - 29349	400 ml dual cartridge - 29350	Resin - 5 gal. pail - 29351* Hardener - 5 gal. pail - 29352*		
	CYANOACRYLATES	Toughened, UV Cure	4311™ Flashcure®	1	One-Part, Moisture/UV	Clear-Pale Green	900	5 sec.	0.079		-65°F to 239°F (-54°C to 115°C)	1 oz. bottle - 14001791	1 lb. bottle - 1401789				
		Low Viscosity, Toughened, High Temperature	4203™ Prism®	1	One-Part, Moisture	Clear	375	30 sec.	0.059		-65°F to 250°F (-54°C to 121°C)	1 oz. bottle - 1376970	1 lb. bottle - 28027				
		Mid-Viscosity, Toughened, High Temperature	4204™ Prism®	1	One-Part, Moisture	Clear	4,000	31 sec.	0.079		-65°F to 250°F (-54°C to 121°C)	3 g tube - 26839	1 oz. bottle - 1376969	1 lb. bottle - 26325			
		Gel, Toughened, High Temperature	4205™ Prism®	1	One-Part, Moisture	Clear	Gel	32 sec.	0.098		-65°F to 250°F (-54°C to 121°C)	20 g tube - 28028	200 g tube - 28029	300 g. cartridge - 28030			
	HOT MELTS	General-Purpose	0450™ Hysol® SprayPac™	1	Cooling	Natural	4,500	5 to 8 min.	0.236		-65°F to 160°F (-54°C to 70°C)	12 oz. bag Polyshot™ - 83353	35 lb. carton Polyshot™ - 83354	12 oz. bag (red) Polyshot™ - 83355	35 lb. carton (red) Polyshot™ - 83356		
		General-Purpose	7804FRM-HV Hysol®	1	Cooling	Amber	6,000	35 sec.	0.236		-65°F to 230°F (-54°C to 110°C)	13 oz. bag Polyshot™ - 83386	40 lb. carton pellets - 83382	5 oz. bag - 10 in. superstick - 83383	30 lb. pail - 10 in. superstick - 83384	25 lb. pail Polyshot™ - 83387	
		General-Purpose	7901™ Hysol®	1	Cooling	Amber	750	35 sec.	0.236		-65°F to 300°F (-54°C to 150°C)	40 lb. carton pellets - 83343	25 lb. pail Polyshot™ - 83344				
		High Adhesion to Metals	3631™ Hysol®	1	Cooling/Humidity	Off-White	12,500	60 sec.	0.236		-65°F to 250°F (-54°C to 121°C)	300 ml cartridge - 31291	5 gal. pail - 31279				
	ELASTOMERIC BONDING	Primerless Adhesion	5512™	1	One-Part, Moisture	Black	Paste	60 min.	>0.5		-40°F to 200°F (-40°C to 93°C)	300 ml cartridge - 41380					
MAGNET BONDING	ACRYLICS	Fast Cure, Acid-Free	331™	2	Activator/Heat	Cream	20,000	20 sec.	0.039		-65°F to 350°F (-54°C to 177°C)	25 ml syringe with manual plunger - 1057673	Liter - 1057674	10 liter pail - 1062124	25 ml EFD syringe w/o manual plunger - 1256398		
		High Impact	392™	2	Activator	Amber	60,000	60 sec.	0.020		65°F to 300°F (-54°C to 150°C)	25 ml syringe with manual plunger - 39205	50 ml tube - 39250	300 ml cartridge - 39275	1 liter bottle - 39280	15 liter pail - 17505	
		Humidity Resistance	A-671™	2	External Mix	Green	15,000	55 sec.	0.051		-65°F to 300°F (-54°C to 149°C)	40 ml dual cartridge - 1256501	Resin - 2 liter pail - 1256502* Hardener - 2 liter pail - 1255708*	4 liter kit - 1256488	Hardener - 19 liter pail - 1255709		
		Large Gap Fill	A-6750™	2	External Mix	Green	30,000	30 to 60 sec.	0.098		-65°F to 300°F (-54°C to 155°C)	Dual cartridge - 1250146+1250147	40 ml dual cartridge - 1256506	Resin - 2 liter pail - 1255702* Hardener - 2 liter pail - 1256503*			
		Acid-Free	3060™	2	External Mix	Green	30,000	10 to 13 min.	0.201		-65°F to 300°F (-54°C to 155°C)	2 x 30 ml syringes - 1087985	Resin - 1 liter pail - 1087986* Hardener - 1 liter pail - 1087988*	Resin - 10 liter pail - 1087988* Hardener - 10 liter pail - 1088035*			
	EPOXIES	Toughened, High Adhesion	E-214HP™ Hysol®FISCHBACH KG KUNSTSTOFF-TECHNIK	1	One-Part Heat	Light Grey	Paste	2 hrs.	>0.5		-65°F to 300°F (-54°C to 150°C)	30 ml EFD syringe - 29339	300 ml cartridge - 29340	5 gal. pail - 29341			
		Induction Cure for Fast Throughput	E-220IC™ Hysol®	1	One-Part Heat/Induction	Grey	Paste	40 sec. (induction)	>0.5		-65°F to 300°F (-54°C to 150°C)	31 ml EFD syringe - 1078250	1 liter bottle - 1078261	5 gal. pail - 1078499			

\* - Made to order item.  
Contact your local sales rep.





		CHEMISTRY	TYPICAL USE	PRODUCT NAME	# OF COMP.	CURE METHOD	COLOR	VISCOSITY (cP)	FIXTURE TIME		CURE-THROUGH DEPTH, IN.	TEMP. RANGE	PACKAGE SIZE – PART NUMBER			
GASKETING	ANAEROBICS		Flexible	509™ Gasket Eliminator®	1	Anaerobic	Blue	65,000	Unprimed - 6 hrs. / Primed -1 hr.		Unprimed - 0.01/Primed - 0.02	-65°F to 300°F (-54°C to 150°C)	300 ml cartridge - 21525	850 ml cartridge - 50965		
			High Temperature	510™ Gasket Eliminator®	1	Anaerobic	Red	188,000	Unprimed - 4 hrs. / Primed -30 min.		Unprimed - 0.01/Primed - 0.02	-65°F to 400°F (-54°C to 204°C)	50 ml tube - 51031	250 ml tube - 51041	300 ml cartridge - 51074	
			General-Purpose	518™ Gasket Eliminator®	1	Anaerobic	Red	800,000	Unprimed - 4 hrs. / Primed - 30 min.		Unprimed - 0.01/Primed - 0.02	-65°F to 300°F (-54°C to 150°C)	6 cc carded tube - 51817	50 ml tube - 51831	300 ml cartridge - 51845	
			Extended Open Time	573™ Flange Sealant	1	Anaerobic	Green	19,000	Unprimed - 6 hrs. / Primed -1 hr.		Unprimed - 0.01/Primed - 0.02	-65°F to 300°F (-54°C to 150°C)	250 ml tube - 16392			
			Fast Cure	574™ Flange Sealant	1	Anaerobic	Orange	30,000	Unprimed -1 hr. / Primed -15 min.		Unprimed - 0.01/Primed - 0.02	-65°F to 300°F (-54°C to 150°C)	50 ml tube - 24801	250 ml tube - 26338	300 ml cartridge - 41013	
	SILICONE, RTV		High Performance	5699™	1	Humidity	Grey	250 g/min.	30 min.		0.236	-65°F to 400°F (-54°C to 200°C)	300 ml cartridge - 18581	50 lb. pail - 18582	550 lb. drum - 18583	
			Instant Seal	5900™	1	Humidity	Black	35 g/min.	20 min.		0.236	-65°F to 500°F (-54°C to 260°C)	300 ml Fischbach® cartridge with threaded tip - 20166	50 lb. pail - 20167	550 lb. drum - 20168	
			General-Purpose	5910™	1	Humidity	Black	600 g/min.	20 min.		0.236	-65°F to 500°F (-54°C to 260°C)	300 ml Fischbach® cartridge with threaded tip - 21746	50 lb. pail - 21747	550 lb. drum - 21748	
			High Temperature	5920™	1	Humidity	Copper	300 g/min.	60 min.		0.236	-65°F to 700°F (-54°C to 370°C)	300 ml cartridge - 82046	70 ml tube - 30542	40 lb. pail - 21472	
	SILICONE, LIGHT CURE		Dual Cure	5039™ Nuva-Sil®	1	UV/Humidity	Translucent/Colorless/Fluorescent	222 g/min.	30 sec. @ 120 mW/cm²		0.236	-65°F to 350°F (-54°C to 177°C)	300 ml cartridge - 40438	40 lb. pail - 40439		
			General-Purpose	5050™ Fastgasket®	1	UV	Translucent	500 g/min.	30 sec.@ 120 mW/cm²		0.236	-65°F to 350°F (-54°C to 177°C)	300 ml cartridge - 1212166	40 lb. pail - 1212165		
			Fast Cure/Black	5950™ Fastgasket®	1	UV/Humidity	Black	350 g/min.	30 sec. @ 120 mW/cm²		0.236	-65°F to 350°F (-54°C to 177°C)	300 ml Fischbach® cartridge - 29287	40 lb. pail - 18495		
			Fast Cure/Clear	5951™ Fastgasket®	1	UV/Humidity	Clear	350 g/min.	30 sec. @ 120 mW/cm²		0.236	-65°F to 350°F (-54°C to 177°C)	40 lb. pail - 18198			
	SILICONE, HEAT CURE		High Durometer	5963™ Procure™	1	Oven Heat	Grey	250 g/min.	10 min. @ 150°C		0.236	-65°F to 400°F (-54°C to 204°C)	50 lb. pail - 34337			
			General-Purpose	5964 Procure™	1	Oven Heat	Brown	120 g/min.	10 min. @ 150°C		0.236	-65°F to 400°F (-54°C to 204°C)	300 ml cartridge - 34348	50 lb pail - 34347		
POTTING (CONT'D. NEXT PAGE)	ACRYLICS		Multi-Cure	3101™	1	UV/Heat/Activator	Slightly Hazy / Straw	6,000	5 sec.		0.394	-65°F to 300°F (-54°C to 148°C)	25 ml syringe - 19861	1 liter bottle - 19860		
			UV + Activator	366™	1	UV/Activator	Clear / Light Amber	7,500	5 sec.		0.079	-65°F to 230°F (-54°C to 110°C)	50 ml bottle - 36631	1 liter bottle - 12224		
	POLYURETHANES		Very Fast	3364™ Hysol®	2	Two-Part (1:2)	Black	12,500	5 min.		0.492	-65°F to 300°F (-54°C to 150°C)	50 ml dual cartridge - 1166733			
			Fast Cure	3173™ / 3182™ Hysol®	2	Two-Part (1:5.2)	Black	5,500	7 min.		0.492	-65°F to 300°F (-54°C to 150°C)	Resin - 1 qt. can - 39984 Hardener - 1 gal. can - 39995	Resin - 1 gal. can - 39985 Hardener - 5 gal. pail - 39996	Resin - 5 gal. pail - 39986 Hardener - 55 gal. drum - 39997	
			General-Purpose	3173™ / 3183™ Hysol®	2	Two-Part (1:3)	Opaque Black	450	20 to 40 min.		0.492	65°F to 300°F (-54°C to 150°C)	Resin - 1 qt. can - 39984 Hardener - 1 gal. can - 39998	Resin - 1 gal. can - 39985 Hardener - 5 gal. pail - 39999	Resin - 5 gal. pail - 39986 Hardener - 55 gal. drum - 39399	
			UL 94 V-0	3173™ / 3184™ Hysol®	2	Two-Part (1:4.8)	Opaque White	2,250	45 min.		0.492	-65°F to 300°F (-54°C to 150°C)	Resin - 1 qt. can - 39984 Hardener - 1 gal. can - 39398	Resin - 1 gal. can - 39985 Hardener - 5 gal pail - 39397	Resin - 5 gal. pail - 39986	
	EPOXY – ONE-PART		UV Initiation	3335™	1	UV/Oven	Hazy White	5,000	UV or 15 min. @ 150°C		0.08 (UV) / 0.5 (Heat)	-65°F to 350°F (-54°C to 176°C)	25 ml syringe - 30288	1 liter bottle - 30289		
			General-Purpose	3981™ Hysol®	1	Oven	Transparent White	5,300	35 min. @ 100°C / 16 min. at 150°C		>0.5	-65°F to 300°F (-54°C to 150°C)	5 ml syringe - 39039	30 ml EFD syringe - 36766	1 liter bottle - 32797	5 gal. pail - 37297*
			Medium Viscosity	3982™ Hysol®	1	Oven	Off-White	8,000	25 min. @ 100°C / 17 min. at 150°C		>0.5	-65°F to 300°F (-54°C to 150°C)	30 ml EFD syringe - 36767	1 liter bottle - 36798	5 gal. pail - 36772*	
			High Viscosity	3985™ Hysol®	1	Oven	Black	47,500	45 min. @ 100°C / 30 min. at 150°C		>0.5	-65°F to 399°F (-54°C to 204°C)	1 liter bottle - 40870	5 gal. pail - 34731	50 lb. pail - 919449*	
	EPOXY – TWO-PART		UV Dual Cure	193124 / 193125	2	UV/Two-Part (2:1)	Transparent / Straw	7,000	60 sec. UV		>0.5	-65°F to 350°F (-54°C to 176°C)	Resin - 5 gal. pail - 777700 Hardener - 5 gal. pail - 777701			
			General-Purpose	E-60NC Hysol®	2	Two-Part (2:1)	Black	10,000	60 min.		>0.5	-65°F to 300°F (-54°C to 150°C)	50 ml dual cartridge - 29324	200 ml dual cartridge - 29325	400 ml dual cartridge - 29326	Resin - 5 gal. pail - 29327 Hardener - 5 gal. pail - 29328
			UL 1446 & UL 94HB	3140™ / 3164™ Hysol®	2	Two-Part (2:1)	Black	1,500	25 to 35 min.		>0.5	-65°F to 300°F (-54°C to 150°C)	Resin - 1 gal. can - 39944 Hardener - 1 gal. can - 39969	Resin - 5 gal. pail - 39945 Hardener - 5 gal. pail - 39970		
			UL 94V-0	3145™ / 3162™ Hysol®	2	Two-Part (2:1)	Black	7,150	35 to 45 min.		>0.5	-65°F to 300°F (-54°C to 150°C)	Resin - 13 lb. can - 40512 Hardener - 1 qt. can - 39960	Resin - 65 lb. pail - 40511	Resin - 65 lb. pail - 40511 Hardener - 5 gal. pail - 39962	
			UL674	E-40EXPTM Hysol®	2	Two-Part (4:1)	Grey	16,500	120 min.		>0.5	-65°F to 300°F (-54°C to 150°C)				





		CHEMISTRY	TYPICAL USE	PRODUCT NAME	# OF COMP.	CURE METHOD	COLOR	VISCOSITY (cP)	FIXTURE TIME	CURE-THROUGH DEPTH, IN.		TEMPERATURE RANGE	PACKAGE SIZE - PART NUMBER				
POTTING (CONT'D.)	SILICONES – LIGHT CURE	Dual Cure	5240™ Nuva-Sil®	1	UV/Humidity	Clear	18,000	60 sec. @ 70 mW/cm²	0.787			-65°F to 350°F (-54°C to 177°C)	25 ml syringe - 1010341	300 ml cartridge - 1010320	40 lb. pail - 1010343*	190 kg drum - 1342966	
		Flowable	5055™	1	UV	Clear	525	60 sec. @ 70 mW/cm²	0.236			-65°F to 350°F (-54°C to 177°C)	25 ml syringe - 1212167	1 liter bottle - 1214246	15 liter pail - 1214247		
		High Adhesion	5056™	1	UV	Clear	2,200	60 sec. @ 70 mW/cm²	0.236			-65°F to 350°F (-54°C to 177°C)	25 ml syringe - 1214249	1 liter bottle - 1214250	15 liter pail - 1214248		
	SILICONES – TWO-PART	Fast Cure	5620™	2	Two-Part (1:1)	Clear	200	24 hrs. or 1 hr. @ 100°C	>0.5			-65°F to 300°F (-40°C to 150°C)	50 ml dual cartridge - 1257593	400 ml dual cartridge - 1257478	Resin - 40 lb. pail - 1257595 Hardener - 40 lb. pail - 1257597	Resin - 400 lb. drum - 1257594 Hardener - 400 lb. drum - 1257596	
		Tack-Free Gel	5623™	2	Two-Part (1:1)	Clear	700	30 min. or 1 hr. @ 100°C	>0.5			-65°F to 300°F (-40°C to 150°C)	400 ml dual cartridge - 1259300	Resin - 40 lb. pail - 1257611 Hardener - 40 lb. pail - 1257607	Resin - 400 lb. drum - 1257612 Hardener - 400 lb. drum - 1257609		
		Soft Gel	5625™	2	Two-Part (1:1)	Clear	1,500	24 hrs. or 1 hr. @ 100°C	>0.5			-65°F to 300°F (-40°C to 150°C)	400 ml dual cartridge - 1257475	Resin - 40 lb. pail - 1257616 Hardener - 40 lb. pail - 1257613	Resin - 400 lb. drum - 1257617 Hardener - 400 lb. drum - 1257615		
		Fast, UL 94V0	5611™ F	2	Two-Part (10:1)	Grey	4,500	10 min. - 7 days full cure	>0.5			-65°F to 300°F (-40°C to 150°C)	490 ml dual cartridge - 1385991	Resin - 4.5 gal. pail - 1387908 Hardener - 4.5 gal. pail - 1387706	Resin - 575 lb. drum - 1386373 Hardener - 440 lb. drum - 1432213		
RETAINING	ANAEROBICS	Slow, UL 94V0	5611™ S	2	Two-Part (10:1)	Grey	5,000	70 min.	>0.5			-65°F to 300°F (-40°C to 150°C)	490 ml dual cartridge - 1386378	Resin - 4.5 gal. pail - 1387908 Hardener - 4.5 gal. pail - 1388496	Resin - 575 lb. drum - 1386373 Hardener - 440 lb. drum - 1387212		
		Wicking Grade	290™	1	Anaerobic	Green	12	30 min.	0.006			-65°F to 300°F (-54°C to 150°C)	0.5 ml capsule - 29005	10 ml bottle - 29021	50 ml bottle - 29031	250 ml bottle - 29041	1 liter bottle - 29043
		General-Purpose	603™	1	Anaerobic	Green	125	Unprimed - 10 min./ Primed -1 min.	0.005			-65°F to 300°F (-54°C to 150°C)	10 ml bottle - 21440	50 ml bottle - 21441	250 ml bottle - 21442	1 liter bottle - 31680	
		High Temperature	620™	1	Anaerobic	Green	8,500	Unprimed - 30 min./ Primed -1 min.	0.015			-65°F to 450°F (-54°C to 232°C)	0.5 ml capsule - 62005	5 ml bottle - 1012623	10 ml bottle - 62040	50 ml bottle - 62040	250 ml bottle - 62070
		High Strength	638™	1	Anaerobic	Green	2,500	Unprimed - 5 min./ Primed -1 min.	0.015			-65°F to 300°F (-54°C to 150°C)	10 ml bottle - 21447	50 ml bottle - 21448	250 ml bottle - 21449	1 liter bottle - 996451	
		Fast Cure	648™	1	Anaerobic	Green	500	Unprimed - 5 min./ Primed -1 min.	0.006			-65°F to 350°F (-54°C to 177°C)	6 ml tube - 33325	10 ml bottle - 21443	50 ml bottle - 21444	250 ml bottle - 21445	1 liter bottle - 21446
		Light Cure	661™	1	Light/Anaerobic	Amber	500	30 sec.	0.006			-65°F to 350°F (-54°C to 177°C)	250 cc bottle - 66141*	1 liter bottle - 66170*			
TACKING	ACRYLIC – LIGHT CURE	Semisolid Stick	QuickStix™ 668™	1	Anaerobic	Green	Semisolid	90 sec.	0.004			-65°F to 400°F (-54°C to 204°C)	19 g stick - 39148				
		Activator Cure	3526™	1	UV/Visible Light/ Oven	Clear/Pale Straw/ Fluorescent	17,800	30 sec.	>0.5			-65°F to 250°F (-54°C to 121°C)	25 ml syringe - 30756	1 liter bottle - 30764			
		High Adhesion to Plastics	3926™	1	Light	Transparent to Hazy/ Fluorescent	4,500	60 sec.	>0.5			-65°F to 212°F (-54°C to 100°C)	25 ml EFD syringe - 36492	1 liter bottle - 36493	15 liter pail - 36494		
		High Adhesion to Metals	3944™	1	Light	Fluorescent/Pale Yellow	5,000	30 sec.	0.551			-65°F to 300°F (-54°C to 150°C)	25 ml EFD syringe - 38210	1 liter bottle - 38211	15 liter pail - 38212		
		General-Purpose – Medium cPs	3971™	1	Light	Transparent to Hazy/ Fluorescent	320	30 sec.	>0.5			-65°F to 300°F (-54°C to 150°C)	25 ml EFD syringe - 36792	1 liter bottle - 36805	15 liter pail - 1057609		
	CYANOACRYLATES	General-Purpose – Low cPs	3972™	1	Light	Transparent to Hazy/ Fluorescent	4,500	30 sec.	>0.5			-65°F to 300°F (-54°C to 150°C)	25 ml EFD syringe - 36294	1 liter bottle - 36295	15 liter pail - 36296		
		Low cPs – Thermally Resistant	4203™	1	Humidity	Clear	375	30 sec.	0.004			-65°F to 250°F (-54°C to 121°C)	1 oz. bottle - 1376970	1 lb. bottle - 28027			
		Medium cPs – Thermally Resistant	4204™	1	Humidity	Clear	4,000	30 sec.	0.008			-65°F to 250°F (-54°C to 121°C)	3 g tube - 26839	1 oz. bottle - 1376969	1 lb. bottle - 26325		
		Gel – Thermally Resistant	4205™	1	Humidity	Clear	Gel	30 sec.	0.012			-65°F to 250°F (-54°C to 121°C)	20 g tube - 28028	200 g tube - 28029	300 g cartridge - 28030		
	HOT MELTS	Medium cPs – UV Cure	4311™ Flashcure®	1	Light/Humidity	Clear/Pale Green/ Fluorescent	900	5 sec.	0.008			-65°F to 240°F (-54°C to 115°C)	1 oz. bottle - 14001791	1 lb. bottle - 1401789			
		Long Open Time	0450™ Hysol® SprayPac®	1	Cooling	Natural	4,500	5 to 8 min.	0.236			-65°F to 155°F (-54°C to 69°C)	12 oz. bag Polyshot™ - 83353	35 lb. carton Polyshot™ - 83354	12 oz. bag (red) Polyshot™ - 83355	35 lb. carton (red) Polyshot™ - 83356	
		High Adhesion to Metals	3631™ Hysol®	1	Cooling/Humidity	Off-White	12,000	60 sec.	0.236			-65°F to 250°F (-54°C to 121°C)	300 ml cartridge - 31291	5 gal. pail - 31279			
		General-Purpose	7804FRM-HV™ Hysol®	1	Cooling	Amber	6,000	35 sec.	0.236			-65°F to 230°F (-54°C to 110°C)	13 oz. bag Polyshot™ - 83386	40 lb. carton pellets - 83382	5 oz. bag, 10 in. superstick - 83383	30 lb. pail, 10 in. superstick - 83384	25 lb. pail Polyshot™ - 83387
		High Temperature	7901™ Hysol®	1	Cooling	Amber	750	35 sec.	0.236			-65°F to 300°F (-54°C to 150°C)	40 lb. carton pellets - 83343	25 lb. pail Polyshot™ - 83344			





	CHEMISTRY	TYPICAL USE	PRODUCT NAME	# OF COMP.	CURE METHOD	COLOR	VISCOSITY (cP)	FIXTURE TIME	CURE THROUGH DEPTH, IN.	TEMPERATURE RANGE	PACKAGE SIZE - PART NUMBER				
THREADLOCKING	ANAEROBICS	Low Strength	222™	1	Anaerobic	Purple	1,200/5,000 Thixotropic	10 min.	N/A	-65°F to 300°F (-54°C to 150°C)	10 ml bottle - 21463	50 ml bottle - 21464			
		General-Purpose	243™	1	Anaerobic	Blue	2,250/12,000 Thixotropic	5 min.	N/A	-65°F to 300°F (-54°C to 150°C)	0.5 ml capsule - 1330255	10 ml soft squeeze bottle - 1329837	50 ml bottle - 1329467	250 ml bottle - 1329505	1 liter bottle - 133033
		High Temperature	2422™	1	Anaerobic	Blue	Paste	90 min.	N/A	-65°F to 650°F (-54°C to 343°C)	30 g syringe with manual plunger - 1134601	300 g cartridge - 1134602			
		General-Purpose	QuickStix™ 248™	1	Anaerobic	Blue	Semisolid	Unprimed - 10 min. / Primed -3 min.	N/A	-65°F to 300°F (-54°C to 150°C)	9 g stick - 37684	19 g stick - 37087			
		High Strength, Fast Set	263™	1	Anaerobic	Red	500	15 min.	N/A	-65°F to 300°F (-54°C to 150°C)	0.5 ml capsule - 1330582	10 ml soft squeeze bottle - 1330583	50 ml bottle - 1330585	250 ml bottle - 1330335	1 liter bottle - 1330334
		High Strength	QuickStix™ 268™	1	Anaerobic	Red	Semisolid	Unprimed - 20 min. / Primed -5 min.	N/A	-65°F to 300°F (-54°C to 150°C)	9 g stick - 37685	19 g stick - 37686PR			
		Wicking Grade	290™	1	Anaerobic	Green	12	6 min.	N/A	-65°F to 300°F (-54°C to 150°C)	0.5 ml capsule - 29005	10 ml bottle - 29021	50 ml bottle - 29031	50 ml bottle - 29041	1 liter bottle - 29043
	CYANOACRYLATES	For Plastics	425™ Assure™	1	Humidity	Blue	80	1.5 hrs.	NA	-65°F to 180°F (-54°C to 82°C)	1 oz. bottle - 42540	1 lb. bottle - 42561			
THREAD SEALING	ANAEROBICS	Hydraulic/Pneumatic	545™	1	Anaerobic	Purple	14,000	4 hrs.	N/A	-65°F to 300°F (-54°C to 150°C)	0.5 ml sample capsule - 54505	10 ml bottle - 32429	50 ml bottle - 54531	250 ml bottle - 54541	1 liter bottle - 54543
		Refrigerant	554™	1	Anaerobic	Red	2,500	4 hrs.	N/A	-65°F to 300°F (-54°C to 150°C)	10 ml bottle - 25882	250 ml bottle - 55441			
		General-Purpose	QuickStix™ 561™ PST®	1	Anaerobic	White	Paste	4 hrs.	N/A	-65°F to 300°F (-54°C to 150°C)	19 g stick - 37127				
		General-Purpose	565™ PST®	1	Anaerobic	White	300,000	4 hrs.	N/A	-65°F to 300°F (-54°C to 150°C)	6 ml tube - 56507	50 ml tube - 56531	250 ml tube - 56541	1 liter bottle - 56543	350 ml brush-top bottle - 35531
		High Temperature	567™	1	Anaerobic	White	540,000	4 hrs.	N/A	65°F to 400°F (-54°C to 204°C)	6 ml tube - 56707	50 ml tube - 56747	250 ml tube - 56765	1 liter bottle - 56790*	350 cc can with brush cap - 33241
		Stainless Steel	QuickStix™ 5671™ PST®	1	Anaerobic	Off-White	Paste	4 hrs.	N/A	-65°F to 300°F (-54°C to 150°C)	19 g stick - 1276167				
		Slow Cure	592™ PST®	1	Anaerobic	White	250,000	4 hrs.	N/A	-65°F to 400°F (-54°C to 204°C)	6 ml tube - 59214	50 ml tube - 59231	250 ml tube - 59241	1 liter bottle - 59243	
	NONREACTIVE	No-Drip	55™ Pipe Sealing Cord	1	No Cure	White	String	Instant	N/A	-65°F to 300°F (-54°C to 150°C)	150 m (5,700 in.) - 35082				
		Oxygen Systems	Thread Sealant for Oxygen Systems	1	Dry	White	Paste	Instant	N/A	-65°F to 140°F (-54°C to 60°C)	50 ml tube - 1265761				
		Plastic Pipes	No More Leaks™ – Solvent-Based	1	Solvent Evaporation	White	Paste	Instant	N/A	-65°F to 400°F (-54°C to 204°C)	2 oz. tube - 80725	7 oz. tube - 80724	1 pint brush top can - 80726		
WIRE REINFORCEMENT	EPOXIES	One-Part, General-Purpose	3985™ Hysol®	1	Oven	Black	47,500	45 min. @ 120°C/ 30 min. @ 150°C	>0.5	-65°F to 400°F (-54°C to 204°C)	1 liter bottle - 40870	5 gal. pail - 34731	50 lb. pail - 919449*		
		Moisture-Resistant	E-05MR™ Hysol®	2	Two-Part (1:1)	Clear	25,000	15 min.	>0.5	-65°F to 400°F (-54°C to 204°C)	25 ml syringe with manual plunger - 1087601	50 ml dual cartridge - 1086598	200 ml dual cartridge - 1086600*	400 ml dual cartridge - 1086599*	Resin - 5 gal. pail - 1087602* Hardener - 5 gal. pail - 1087603*
		High Impact	E-20HP™ Hysol®	2	Two-Part (2:1)	Off-White	45,000	60 min.	>0.5	-65°F to 400°F (-54°C to 204°C)	50 ml dual cartridge - 29314	200 ml dual cartridge - 29315	400 ml dual cartridge - 29316	Resin - 5 gal. pail - 29317* Hardener - 5 gal. pail - 29318*	
		General-Purpose	E-40FL Hysol®	2	Two-Part (1:1)	Grey	70,000	120 min.	>0.5	-65°F to 400°F (-54°C to 204°C)	50 ml dual cartridge - 29304	200 ml dual cartridge - 29305	400 ml dual cartridge - 29306		

\* - Made to order item.  
Contact your local sales rep.