LOCTITE®

"Do it Right" User's Guide

The "WHEN, WHERE & HOW" to use LOCTITE® Maintenance Products

A Henkel Company

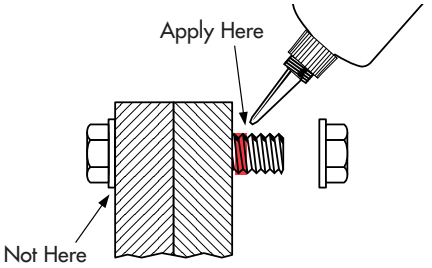
CONTENTS

The primary function of this User's Guide is to help you, the maintenance professional, with the proper selection and use of Loctite® products. A wide variety of preventative maintenance, as well as repair techniques, are explained in step-by-step detail. Consider this a supplemental service manual for every piece of equipment in your plant. Our goal is to make it easier for you to use our products to your benefit for faster repair times, reduced downtime, and extended equipment life. Additional information on these products, as well as others, is available by contacting your local Loctite adhesives and sealants representative at the telephone number listed on the back cover of this guide.

CONTENTS

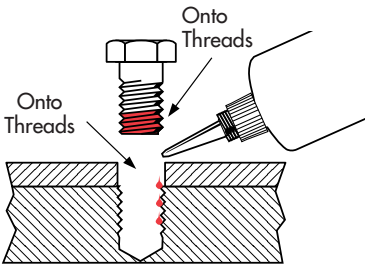
THREADLOCKING

THRU HOLE (BOLTS AND NUTS)



1. Clean all threads (bolt and nut) with Loctite® ODC-Free Cleaner & Degreaser.
2. If necessary, spray all threads with Loctite® 7649 Primer N. Allow to dry.
3. Select the proper strength Loctite Threadlocker product.
4. Insert bolt into thru hole assembly.
5. Apply several drops of Threadlocker onto bolt at targeted tightened nut engagement area.
6. Assemble and tighten nut as usual.

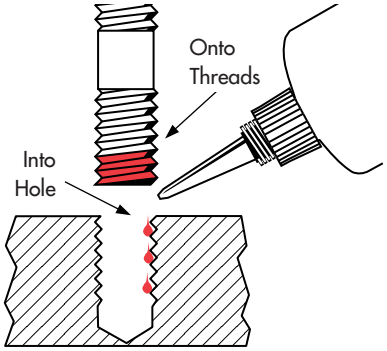
BLIND HOLES (CAP SCREWS, ETC.)

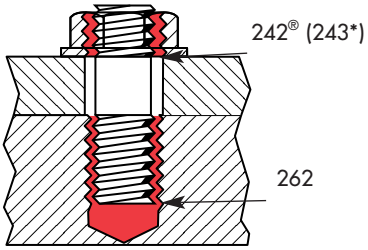


1. Clean all threads (bolt and hole) with Loctite® ODC-Free Cleaner & Degreaser.
2. If necessary, spray (bolt and hole) with 7649 Primer N. Allow 30 seconds to dry.
3. Select the proper strength Threadlocking product.
4. Squirt several drops down the sides of the female threads.
5. Apply several drops to bolt.
6. Tighten as usual.

Note: Using Loctite® Threadlockers will virtually eliminate stripped threads in aluminum or magnesium housings caused by galvanic corrosion.

BLIND HOLES (STUDS, ETC.)



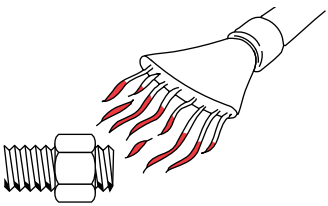


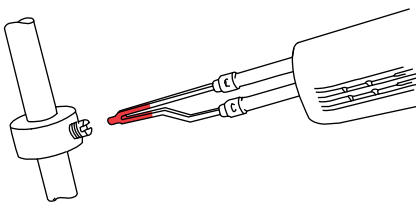
1. Clean all threads (bolt and hole) with Loctite® ODC-Free Cleaner & Degreaser.
2. If necessary, spray all threads with 7649 Primer N. Allow to dry.
3. Squirt several drops of Loctite® **262** Threadlocker down the sides of the female threads.

   Note: Use **277*** Threadlocker if stud is over 1" diameter.
4. Apply several drops of **262** Threadlocker onto stud threads.
5. Install studs.
6. Position cover, head, etc.
7. Apply drops of Loctite **242® (243*)** Threadlocker onto exposed threads.
8. Tighten nuts as required.

** Worldwide or Application-Specific Alternative*

HIGH STRENGTH DISASSEMBLY





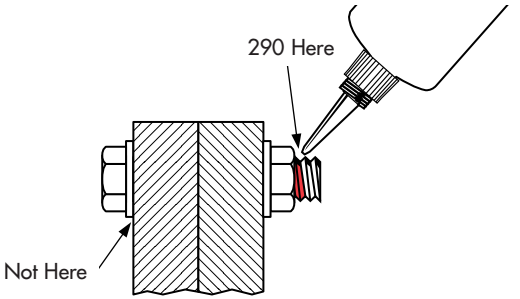
Localized Heating Methods

1. Apply localized heat to nut or stud (450°F for 5 minutes).
2. Disassemble while HOT.

   Note: Use standard hand tools for disassembly of low and medium strength Threadlockers.

THREADLOCKING

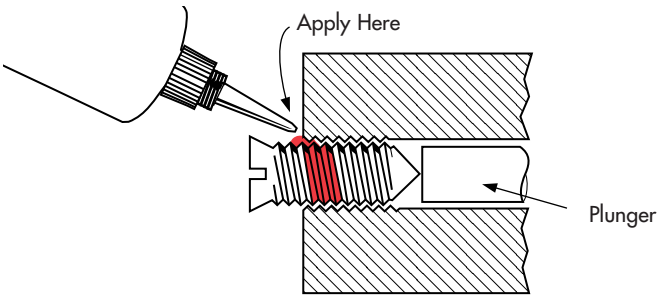
PRE-ASSEMBLED FASTENERS



1. Clean bolts and nuts with Loctite® ODC-Free Cleaner & Degreaser.
2. Assemble components.
3. Tighten nuts.
4. Apply drops of Loctite® **290** Threadlocker at the nut and bolt juncture.
5. Avoid touching bottle tip to metal.

Note: For preventive maintenance on existing equipment: RETIGHTEN nuts and apply Loctite® **290** Threadlocker at the nut and bolt juncture.

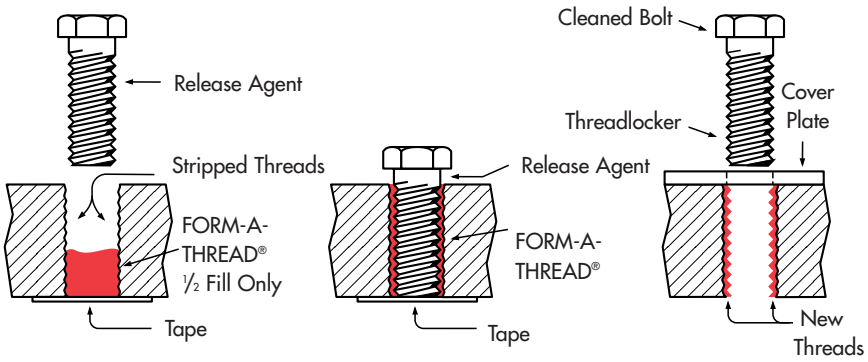
ADJUSTMENT SCREWS



1. Adjust screw to proper setting.
2. Apply drops of Loctite® **290** Threadlocker at screw and body juncture.
3. Avoid touching bottle tip to metal.

Note:
- If re-adjustment is difficult, apply heat to screw with soldering gun (450°F).
- Loctite® **222MS** Threadlocker is a weaker version of Loctite® **290** Threadlocker.

STRIPPED THREAD REPAIR



STANDARD THREAD REPAIR

1. Follow instructions on Loctite® FORM-A-THREAD® package.
2. If cover plate is used for bolt alignment:
   (a) Apply release agent to mating faces around repair area.
   (b) Use "waxed" paper or similar film between faces.
3. A "jiggling/twisting" motion when initially inserting bolt improves thread-conformation.
   Note: NOT intended for engine stud repair.

SMALL HOLE/FINE THREAD REPAIR

OPTION 1. Drill out damaged hole to oversize then follow STANDARD THREAD REPAIR.

OPTION 2. Apply FORM-A-THREAD® to screw and insert into damage hole. Clamp in place while product cures.

STUD INSTALLATION — PERMANENT (LIGHT DUTY)

1. Use stud or cut "all thread" to desired length.
2. Do NOT apply release agent to stud.
3. Proceed as STANDARD THREAD REPAIR.
4. Allow 30 minutes to cure.
5. Assemble as required.

THREADLOCKING

HEAT SEIZURE PREVENTION – ANTI-SEIZE

LOCTITE® ANTI-SEIZE QUICK SELECTOR

Color	Max Temp.	Product	Size
C5-A® Copper	1800°F	51007	1 lb. Brush Top
		51003	12 oz. aerosol
Silver Grade	1600°F	76764	1 lb. Brush Top
		76759	12 oz. aerosol
Nickel	2400°F	77164	1 lb. Brush Top
		51286	12 oz. aerosol

Anti-Seize compounds protect mated metal parts against friction, galling and corrosion. Anti-Seize also reduces wrench torque to facilitate assembly and disassembly of threaded connections.

LOCTITE® THREADLOCKER QUICK SELECTOR

Use	Strength	Product	Color
Small Screws	Low	222MS	Purple
Nuts & Bolts	Medium	242® (243*)	Blue
Pre-Assembled	Medium	290	Green
Nuts & Bolts	High	262	Red
Studs (up to 1")	High	262	Red
Studs (over 1")	High	277	Red

WHY USE A PRIMER?

1. Primers activate inactive surfaces.
2. Primers speed cure times for faster return to service.
3. Primers speed curing through larger gaps and deep threads.
4. Primers substantially speed cure times on cold parts.
5. Primers act as cleaning agents.

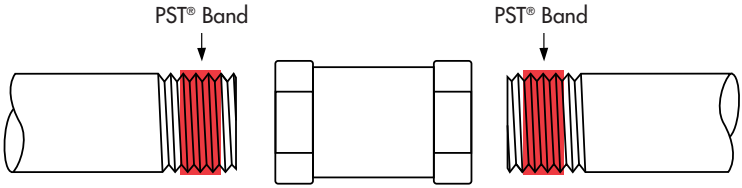
Active surfaces (Primer optional): Brass, copper, bronze, iron, soft steel, nickel.

Inactive surfaces (Primer required): Aluminum, stainless steel, magnesium, zinc, black oxide, cadmium, titanium, others.

**Worldwide or Application-Specific Alternative*

THREAD SEALING

STANDARD FITTINGS – PIPE, HYDRAULICS, OR AIR



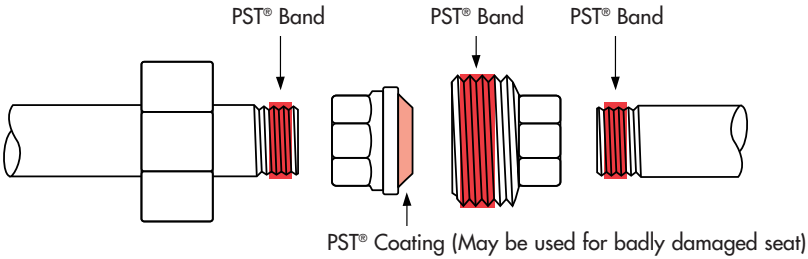
1. Clean parts of contamination. If necessary, spray Loctite® 7649 Primer N onto threaded parts (male and female). Allow to dry.
   Note: Primer is not required for brass parts.
2. Apply a band of PST® Pipe Sealant to male threads starting one to two threads from end of pipe.
3. Assemble parts snugly. Do not overtighten.
4. If initial pressure exceeds 1000 psi*, wait 30 minutes before pressurizing.

Note:

- For stainless steel components, use PST® Pipe Sealant **567**.
- For general purpose thread sealing, use PST® Pipe Sealant **565**.
- For fine filtration systems requiring zero contamination, use Hydraulic/Pneumatic Sealant **545**.
- For easier disassembly or large diameter fittings, use Thread Sealant **564**.
- If sealing chemicals or strong acids/bases, refer to Fluid Compatibility Chart (LT-836).
- Do not use on oxygen or strong oxidizers (chlorine).
- Do not use on PVC or ABS pipe.

**Depending on conditions*

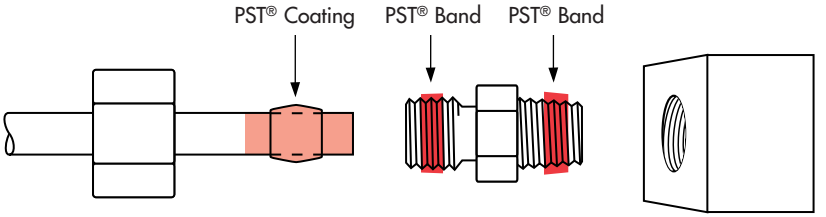
PIPE UNIONS



1. Disassemble and if necessary, spray all components with Loctite® 7649 Primer N. Allow to dry.
2. Apply a thin coating of PST® Pipe Sealant to union face.
3. Apply a band of PST® Pipe Sealant to male threads.
4. Assemble parts snugly.

THREAD SEALING

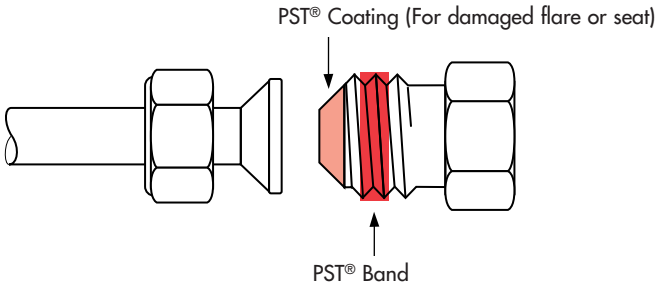
COMPRESSION FITTINGS



1. Slide fitting nut and ferrule back approximately ¾" from end of tubing.
2. If necessary, spray the entire assembly with Loctite® 7649 Primer N. Allow to dry.
   Note: Primer is not required for brass parts.
3. Apply a thin coating of PST® Pipe Sealant to tubing where ferrule will be located.
4. Slide ferrule forward over PST® Pipe Sealant coated tubing, then apply a thin bead of PST® Pipe Sealant coating to ferrule.
5. Slide ferrule forward over PST® coated tubing.
6. Apply a small band of PST® Pipe Sealant to male threads.
7. Assemble and tighten normally.

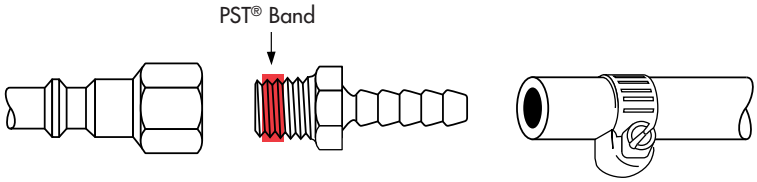
   Note: Do not use on plastic fittings or tubing.

FLARED/SWAGED FITTINGS



1. Disassemble and if necessary, spray all components with Loctite® 7649 Primer N. Allow to dry.
2. Apply a thin coating of PST® Pipe Sealant to fitting face.
3. Apply a band of PST® Pipe Sealant to male threads.
4. Assemble parts snugly.

HOSE ENDS – AIR & HYDRAULIC



1. If necessary, spray adapter threads with Loctite® 7649 Primer N. Allow to dry.
2. Insert barbed hose stem into hose I.D. with slight twisting motion.
3. Install appropriate hose clamp.
4. Apply a band of PST® Pipe Sealant to male hose stem threads upon installation or adding accessory device. Tighten snugly.

Note: PST® may attack synthetic rubber tubing.

THREAD SEALING QUICK SELECTOR (TAPERED THREADS)

Application	Product	Primer	Instant Seal	Max. Pressure	Max. Steam	Temp. Range
Stainless Steel and All Other Metal Fittings	**PST® Pipe Sealant 567**	N	500 PSI	10000 PSI (24 Hours)	135 PSI	-65° to +400°F
Most Metal Fittings Except Stainless Steel	**PST® Pipe Sealant 565**	N	500 PSI	10000 PSI (24 Hours)		-65° to +300°F
High Filtration/ Zero Contamination Systems	**Hydraulic/ Pneumatic Sealant 545**	T	500 PSI (10 Mins.)	10000 PSI (24 Hours)		-65° to +300°F
Stainless Steel and All Other Metal Fittings (lower strength)	**Thread Sealant 564**	N	500 PSI	10000 PSI (24 Hours)		-65° to +300°F

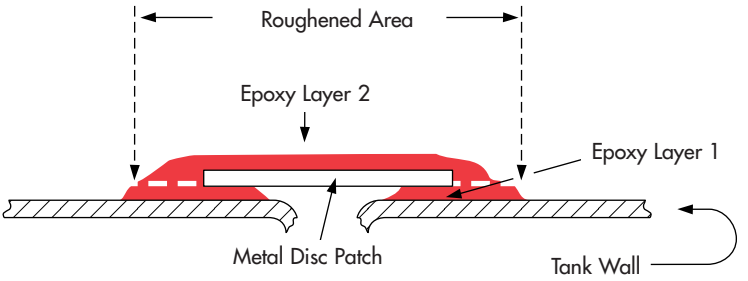
DO NOT USE THESE PRODUCTS ON OXYGEN OR STRONG OXIDIZERS.

FLUID COMPATIBILITY QUESTIONS?

1. Refer to Fluid Compatibility Chart – LT-836.
2. Contact your local Industrial Distributor.
3. Call Loctite Technical Information. See back cover for the Loctite Technical Information number in your area.

PUNCTURE SEALING

TANKS, VESSELS, ETC.



1. IMPORTANT! TAKE PROPER SAFETY PRECAUTIONS IF WORKING WITH FLAMMABLE LIQUID TANKS. AVOID USE WITH COMPRESSIBLE GASSES.
2. Clean the repair area with Loctite® ODC-Free Cleaner & Degreaser.
3. Roughen a 1"- 2" radius around hole with emery cloth. Clean again.
4. Prepare a metal disc patch slightly larger than hole.
5. Mix Loctite® Fixmaster® Fast Cure Epoxy (A and B) per directions.
6. Apply a thin layer of Fast Cure Epoxy to roughened area.
7. Immediately position disc patch over hole.
8. Apply a cover layer of Fast Cure Epoxy over disc patch and Epoxy layer 1.
9. Allow to cure before service use:
   a. Liquid storage — 1 hour.
   b. Low pressure (under 150 PSI) — 1 hour.
   c. High Pressure — Not Recommended over 150 PSI.
10. Paint as required.

SEALING CRACKS

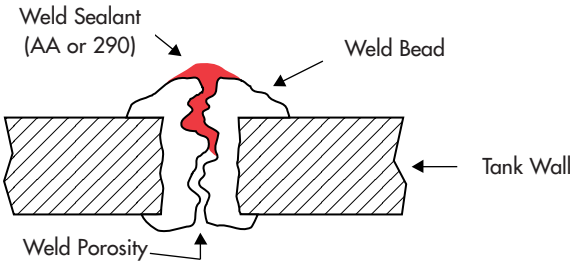
1. Drill termination holes to prevent further cracking.
2. Follow directions above. Modify as needed.

SEALING PINHOLES

1. Follow directions above. No disc patch needed.

POROSITY SEALINGS

EXISTING WELD POROSITIES AND CASTINGS



1. IMPORTANT! TAKE PROPER SAFETY PRECAUTIONS IF WORKING WITH FLAMMABLE LIQUID TANKS. AVOID USE WITH COMPRESSIBLE GASSES.
2. Wire brush to remove paint, rust, etc. from repair area.
3. Clean repair area with Loctite® ODC-Free Cleaner & Degreaser.
4. Apply localized heat to bring repair area to approx. 250°F.
5. Allow repair area to cool to approx. 185°F.
6. Brush or spray sealant on repair area.

   Note:
   - Steel — Use Loctite® AA Weld Sealant at 185°F.
   - Aluminum/stainless — Use Loctite® **290** Threadlocker at 120°F.

   Note:
   - Not recommended for "blowholes"
   - Maximum porosity sealed — .005"
7. Allow to cure for 30 minutes (High Pressure above 150 PSI — 1 hour)
8. Clean with Loctite® ODC-Free Cleaner & Degreaser to remove excess sealant. Do not grind.
9. Paint as required.

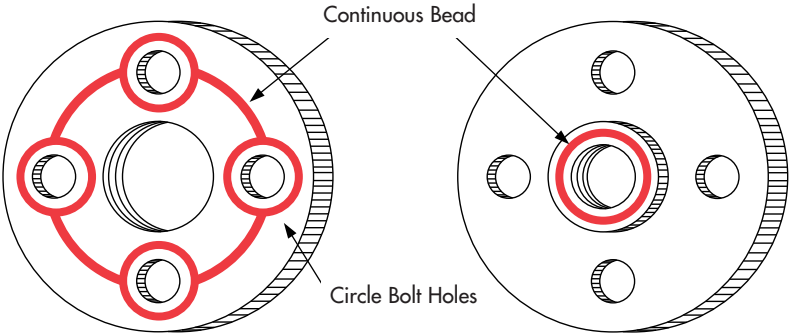
   Note: Casting repair uses same procedure.

SEALING NEW WELDS — PREVENTATIVE MAINTENANCE

1. Remove all slag and scale while hot.
2. Apply sealant when weld is 185°F and falling.
3. Follow information above.

FORM-IN-PLACE GASKETING

SEALING CAST RIGID FLANGES



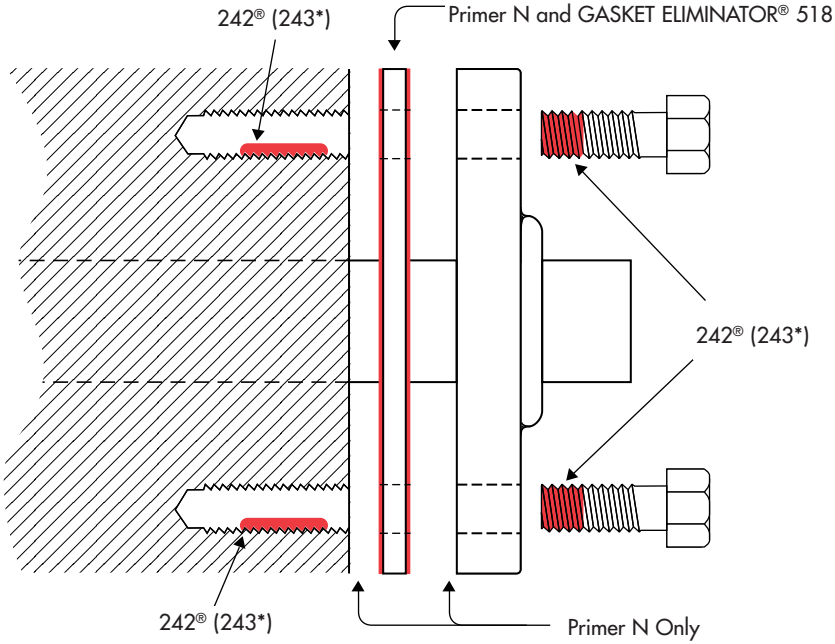
1. Remove old gasketing material and other heavy contaminants with Loctite® CHISEL® Gasket Remover. Use mechanical removal technique if required.
   Note: Avoid grinding.
2. Clean both flanges with Loctite® ODC-Free Cleaner & Degreaser.
3. Spray Loctite® 7649 Primer N on only one surface. Allow 1-2 minutes to dry.
4. Apply a continuous bead of GASKET ELIMINATOR® to the other surface.
   Note: Circle all bolt holes with sealant, if appropriate.
5. Mate Parts. Assemble and tighten as required. **Note:** Immediate assembly not required; however avoid delays over 45 minutes.
6. Allow to cure:
   a. No pressure – immediate service
   b. Low pressure (up to 500 PSI) – 30 to 45 minutes
   c. High pressure (500 to 2500 PSI) – 4 hours
   d. Extreme high pressure (2500 to 5000 PSI) – 24 hours

LOCTITE® GASKETING QUICK SELECTOR

Use	Product	Gap Fill	Temp. Range
General	MASTER GASKET® Kit	.050"	-65° to 300°F
General	GASKET ELIMINATOR® **518**	.050"	-65° to 300°F
General	GASKET ELIMINATOR® **515**	.050"	-65° to 300°F
Hi-Temp	GASKET ELIMINATOR® **510**	.020"	-65° to 400°F

GASKET DRESSING

SEALED FLANGES WITH GASKET



1. Remove old gasketing material and other heavy contaminants with Loctite® CHISEL® Gasket Remover. Use mechanical removal technique if required.

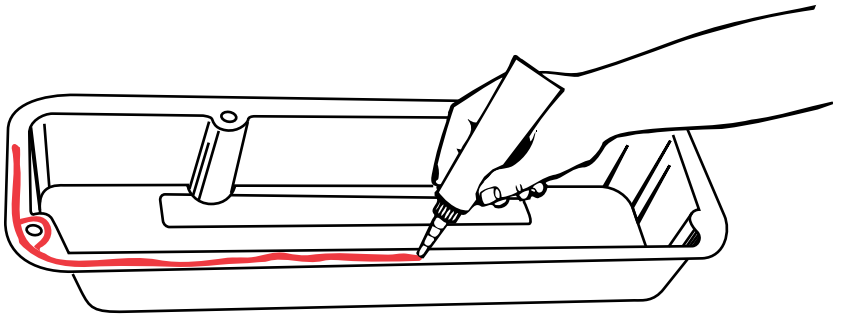
   Note: Avoid grinding.
2. Clean both flanges with Loctite® ODC-Free Cleaner & Degreaser.
3. Spray Loctite® 7649 Primer N on both flange faces and both sides of the precut gasket. Allow 1-2 minutes to dry.
4. Smear GASKET ELIMINATOR® to both sides of precut gasket with a clean applicator.
5. Place coated gasket on flange surface and assemble parts immediately.

   Note:
   - If cover bolts into blind holes (as above), apply **242® (243*)** Threadlocker into hole and on threads. Tighten normally.
   - If through bolt assembly, apply **242® (243*)** Threadlocker to bolt threads.
6. Tighten normally.

** Worldwide or Application-Specific Alternative*

FORM-IN-PLACE GASKETING

STAMPED OR SHEET METAL FLANGES



1. Remove old gasketing material and other heavy contaminants with Loctite® CHISEL® Gasket Remover.
2. Clean both flanges with Loctite® ODC-Free Cleaner & Degreaser.
3. Apply a continuous bead of Loctite® Instant Gasket or High Performance Silicones to sealing surface. Circle all bolt holes.

   Note:
   - Use proper bead diameter to seal flange width and depth.
   - Minimize excessive material "squeeze in".
4. Assemble within 10 minutes by pressing together. Tighten as required.
5. Clean up any excess or squeeze out.
6. Cure times will vary with temperature, humidity, and gap. Typical full cure time is 24 hours.

	INSTANT GASKET*	587 BLUE
Color	Black	Blue
Viscosity cP	Paste	Paste
Gap Fill	0.250"	0.250"
Cure Method	Moisture/Oxime	Moisture/Oxime
Cure Speed		
Tack Free	30 Minutes	30 Minutes
Full Cure	24 Hours	24 Hours
Sevice Temp. Range		
Intermitent	-75° to 500°F -59° to 260°C	-75° to 500°F -59° to 260°C

*Instant Gasket provides a low pressure instant seal (100 psi at zero gap).

FORM-IN-PLACE GASKETING

HIGH PERFORMANCE SILICONES

LOCTITE® HIGH PERFORMANCE SILICONES QUICK SELECTOR

Product	Use	Gap Fill	Temperature Range[1]
587 Blue	General	.250	-75° to 450°F
598 Black	General	.250	-75° to 450°F
5699 Grey	General	.125	-75° to 450°F
5920 Copper	Hi-Temp	.250	-75° to 600°F

1. Continuous service. Intermittent temperature higher than established range.

2. Exceeds import manufacturers performance requirements.

Note: Silicones used at extreme high temperatures can seal but lose various properties.

REASONS TO USE HIGH PERFORMANCE SILICONES INSTEAD OF STANDARD RTV SILICONES

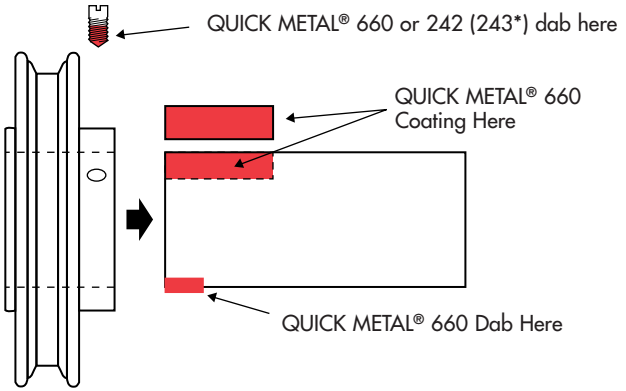
- LOCTITE® HIGH PERFORMANCE SILICONES WILL NOT CORRODE STEEL OR ALUMINUM. Standard RTV acetoxy silicones (vinegar smell) should not be used to seal closed systems (gear boxes, electrical boxes, etc.). Acetic acid will corrode internal parts (bearings, contacts, etc.).
- LOCTITE® HIGH PERFORMANCE SILICONES ARE 8 TIMES MORE OIL RESISTANT THAN STANDARD RTV SILICONES. Standard RTV silicones should not be used to seal "Hot Oil" systems (oil pan, etc.). They swell and lose sealing ability.

REASONS TO USE GASKET ELIMINATOR® INSTEAD OF STANDARD RTV SILICONES

- LOCTITE® GASKET ELIMINATOR® IS RESISTANT TO GASOLINE AND FUEL OILS. Silicones should not be used to seal fuel systems. They swell and lose sealing ability.
- LOCTITE® GASKET ELIMINATOR® RESISTS "BLOW-OUT". Silicones are not recommended for high pressure applications.

STRENGTHEN KEYED ASSEMBLIES

KEYED ASSEMBLIES – STANDARD DUTY



ASSEMBLY

1. Clean all parts with Loctite® ODC-Free Cleaner & Degreaser.
2. If necessary, spray all parts (I.D. and O.D.) with Loctite® 7649 Primer N.
3. Apply Loctite® QUICK METAL® 660 coating into keyway and on key.
4. Apply dab(s) of QUICK METAL® 660 onto shaft opposite keyway or evenly spaced around shaft.
5. Assemble parts. Wipe off excess.
6. Apply QUICK METAL® 660 dab to set screw.
7. Tighten set screw.
8. Allow 5-10 minutes prior to service.

Note:

- QUICK METAL® 660 is NOT recommended for radial gaps exceeding .010" on shaft or keyway.
- See BADLY WALLOWED KEYWAY for procedure page 20.

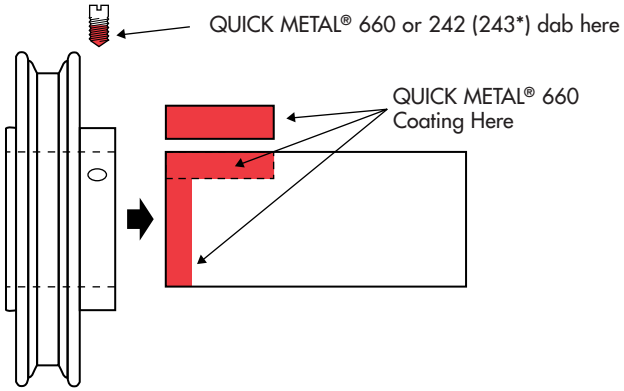
DISASSEMBLY

1. Tap component and key with hammer.
2. Pull as usual.

** Worldwide or Application-Specific Alternative*

STRENGTHEN KEYED ASSEMBLIES

KEYED ASSEMBLIES–HEAVY DUTY



ASSEMBLY

1. Clean all parts with Loctite® ODC-Free Cleaner & Degreaser.
2. Apply a QUICK METAL® 660 coating around shaft, into keyway, and on key.
3. Assemble parts. Wipe off excess.
4. Apply a QUICK METAL® 660 dab to screw.
5. Tighten set screw.
6. Allow 30 minutes prior to service.

Note:

- If gap exceeds .005", use Loctite® 7649 Primer N on appropriate area (shaft or keyway).
- QUICK METAL® 660 is NOT recommended for radial gaps exceeding .010" on shaft or keyway.
- See BADLY WALLOWED KEYWAY for procedure page 20.

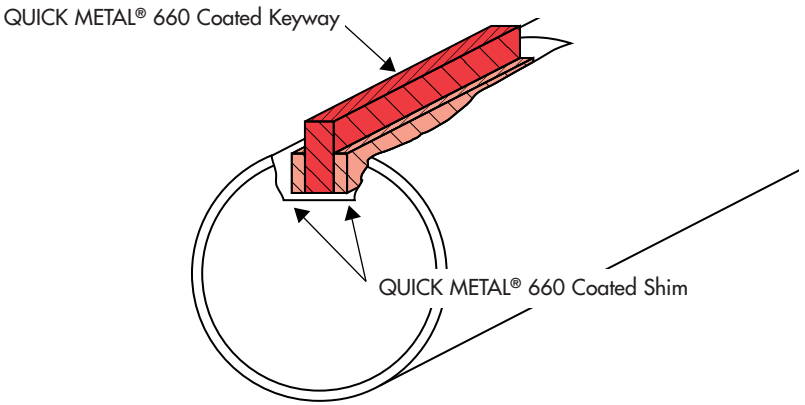
DISASSEMBLY

1. Tap component and key with hammer.
2. If necessary, apply localized heat (450° for five minutes).
3. Pull while hot.

** Worldwide or Application-Specific Alternative*

STRENGTHEN KEY ASSEMBLIES

REPAIR BADLY WALLOWED KEYWAY



1. Determine the gap width on each side of key.
2. Select and trim appropriate shim stock.
3. Clean all parts with Loctite® ODC-Free Cleaner & Degreaser.
4. If necessary, spray all parts with Loctite® 7649 Primer N. Allow to dry.
5. Apply a Loctite® QUICK METAL® 660 coating into keyway
6. Install shims.
7. Assemble as required using QUICK METAL® 660.
8. Allow 30-60 minute cure time.

Note:

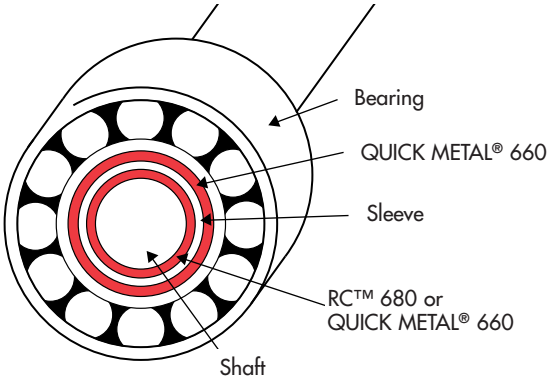
- Minimize "gap fill" using shim stock.
- QUICK METAL® 660 is NOT recommended for lateral gaps exceeding .010".
- Higher strengths are obtained by NOT using Primer N with small (.002"-.004") gap, and allowing longer cure (4-24 hours).

EMERGENCY REPAIR ONLY!

Due to the nature of the damage, this should be considered a temporary repair until the unit can be replaced.

SHAFT MOUNTED COMPONENTS

REPAIR BADLY WORN SHAFT



1. Determine a minimum radial gap.
2. Select and trim appropriate sleeve to allow component slip fit.
3. Roughen sleeve O.D. with emery cloth.
4. Clean all parts with Loctite® ODC-Free Cleaner & Degreaser.
5. Apply a Loctite® RC™ **680** or Loctite® QUICK METAL® 660 coating around the shaft.
6. Install sleeve.
7. Apply a coating of Loctite® QUICK METAL® 660 to sleeve O.D.
8. Install component as required onto sleeved shaft.
9. Allow 30-60 minute cure.

Note:

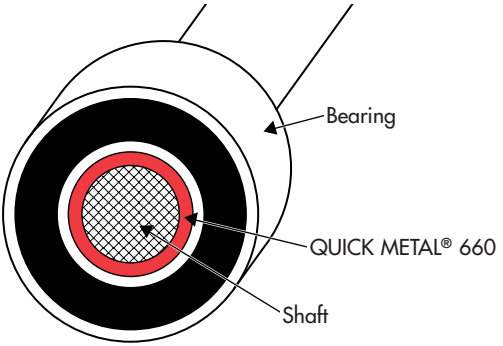
- Minimize gap fill using shim stock or sleeve material.
- QUICK METAL® 660 is NOT recommended for radial gaps exceeding .010".
- Higher strengths are obtained by NOT using Primer N with small (.002"-.004") gap, and allowing longer cure (4-24 hours).

EMERGENCY REPAIR ONLY!

Due to the nature of the damage, this should be considered a temporary repair until the unit can be replaced.

SHAFT MOUNTED COMPONENTS

SLIP FIT — LIGHT DUTY



ORIGINAL

1. Machine shaft to .002" radial slip fit with 50-80 rms finish (second cut).
2. Clean all parts with Loctite® ODC-Free Cleaner & Degreaser.
3. Spray all parts (I.D. and O.D.) with Loctite® 7649 Primer N.
4. Apply Loctite® QUICK METAL® 660 dabs around shaft at engagement area.
5. Assemble parts. Do not rotate.
6. Wipe off excess.
7. Allow ten minutes prior to service.

WORN SHAFT

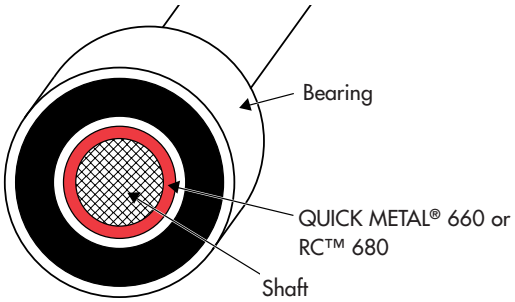
Follow directions above except:

1. Determine radial gap.
2. If radial gap exceeds .005", Loctite® 7649 Primer N must be used.
3. Take steps to maintain concentricity with large gaps.
4. Larger gaps require longer cure times (30-60 minutes).
5. Loctite® QUICK METAL® 660 is NOT recommended for radial gaps exceeding .010".
6. See procedure for BADLY WORN SHAFT page 21.

Note: Loctite® QUICK METAL® 660 is very fast fixturing (30 seconds or less) with Loctite® 7649 Primer N.

SHAFT MOUNTED COMPONENTS

SLIP FIT — HEAVY DUTY



ORIGINAL

1. Machine shaft to .002" radial slip fit with 50-80 rms finish (second cut).
2. Clean all parts with Loctite® ODC-Free Cleaner & Degreaser.
3. Do NOT use Loctite® 7649 Primer N.
4. Apply a Loctite® QUICK METAL® 660 coating around shaft and engagement area.
5. Assemble parts with rotating motion.
6. Wipe off excess.
7. Allow 2 hours prior to service.

WORN SHAFT

Follow directions above except:

1. Determine radial gap.
2. If radial gap exceeds .005", Loctite® 7649 Primer N must be used.
3. Take steps to maintain concentricity with large gaps.
4. Larger gaps require longer cure times (30-60 minutes).
5. QUICK METAL® 660 is NOT recommended for radial gaps exceeding .010".
6. See procedure for BADLY WORN SHAFT page 21.

MAXIMUM STRENGTH

1. Same as above, except use Loctite® RC™ **680** with Loctite® 7471 Primer T or no primer.
2. Allow 4-24 hours to cure.

MAXIMUM TEMPERATURE (400°F continuous)

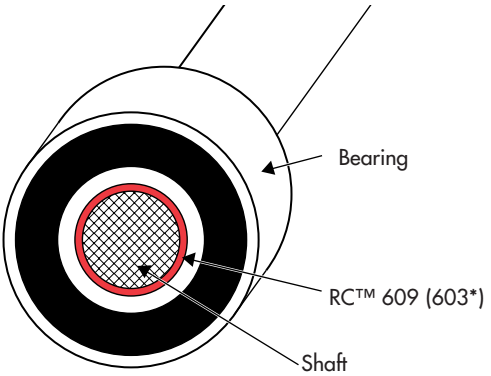
1. Same as above, except use Loctite® RC™ **620** with Loctite® 7471 Primer T.

DISASSEMBLY

1. Pull as usual.
2. If necessary, apply localized heat (450°F for 5 minutes). Pull while hot.

SHAFT MOUNTED COMPONENTS

PRESS FIT



STANDARD

1. Clean shaft O.D. and Component I.D.
2. Apply a bead of Loctite® RC™ **609 (603*)** to circumference of shaft at leading edge of insertion or leading area of engagement.

   Note:
   - Retaining compound will always be squeezed to the outside when applied to shaft.
   - Do NOT use with Loctite® Anti-Seize or similar product.
3. Press as usual. Wipe off excess.
4. No cure time required.

   Note: RC™ **609 (603*)** is used due to low viscosity and wetting properties.

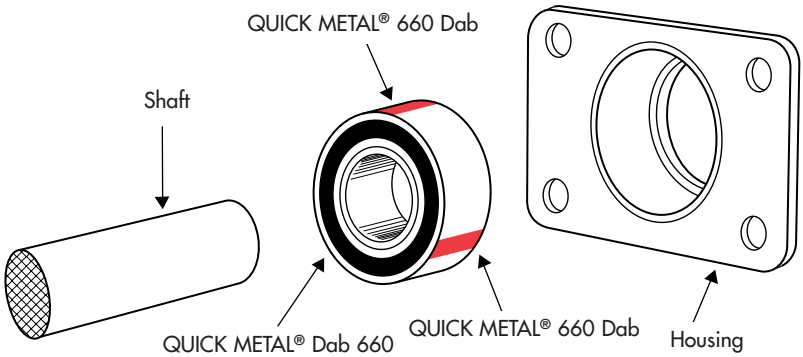
TANDEM MOUNT

1. Apply retaining compound to bore of inside component.
2. Continue assembly as above.

** Worldwide or Application-Specific Alternative*

HOUSED COMPONENTS

SLIP FIT – LIGHT DUTY



ORIGINAL

1. Select component to fit shaft.
2. Machine to reduce component O.D. or increase housing I.D. to permit approximate .002" - .004" diametral slip fit.
3. Clean all parts with Loctite® ODC-Free Cleaner & Degreaser and spray with Loctite® 7649 Primer N.
4. Apply several Loctite® QUICK METAL® 660 dabs to component O.D.
5. Install component. Do not rotate.
6. Wipe off excess.
7. Allow five minutes prior to service.

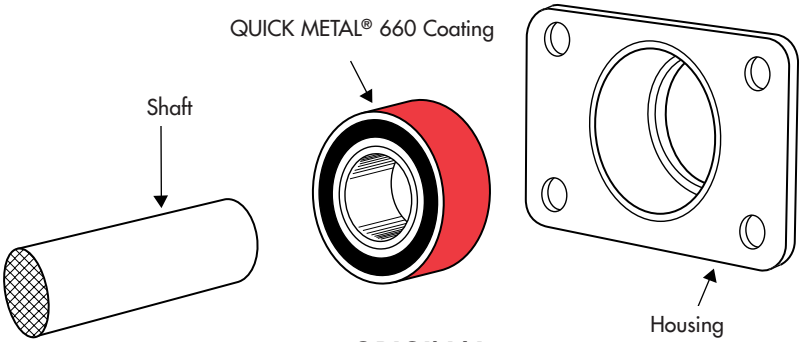
WORN

Procedures identical to original slip fit, except:

1. Determine the maximum radial gap.
2. If the maximum gap exceeds .005", Loctite® 7649 Primer N must be used.
3. Take steps to maintain concentricity on large gaps.
4. Large gaps require longer cure times (30-60 minutes).
5. QUICK METAL® 660 is NOT recommended for radial gaps exceeding .010".
6. See procedure for BADLY WORN HOUSING page 27.

HOUSED COMPONENTS

SLIP FIT – HEAVY DUTY



ORIGINAL

1. Select component to fit shaft.
2. Machine to reduce component O.D. or housing I.D. to permit approximate .002" - .004" diametral slip fit.
3. Clean all parts with Loctite® ODC-Free Cleaner & Degreaser.
4. Do NOT use Primer N.
5. Apply a Loctite® QUICK METAL® 660 coating to component O.D.
6. Install component with twisting motion.
7. Wipe off excess.
8. Allow 2 hours prior to service.

WORN

Procedures are identical to original slip fit, except:

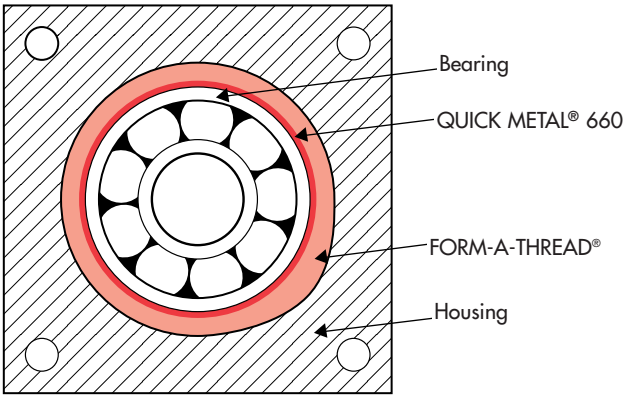
1. Determine the maximum radial gap.
2. If the maximum radial gap exceeds .005", then Loctite® 7649 Primer N must be used.
3. Take steps to maintain concentricity on large gaps.
4. Large gaps require longer cure times (30-60 minutes).
5. QUICK METAL® 660 is NOT recommended for radial gaps exceeding .010".
6. See procedure for BADLY WORN HOUSING page 27.

DISASSEMBLY

1. Pull as usual.
2. If necessary, apply localized heat (450° F for five minutes).
3. Pull while hot.

HOUSED COMPONENTS

REPAIRING BADLY WORN HOUSING



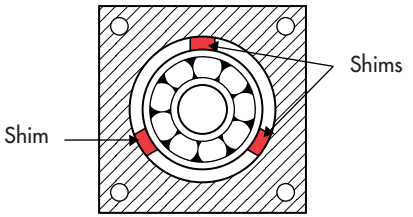
1. Roughen housing I.D. with emery cloth.
2. Clean the housing I.D. with Loctite® ODC-Free Cleaner & Degreaser.
3. Clean the component O.D. and apply Loctite® FORM-A-THREAD® release agent. Allow to dry.
4. Prepare (mix) Loctite® FORM-A-THREAD®.
5. Apply a light coating of Loctite® FORM-A-THREAD® to component O.D.
6. Position the component in housing. Maintain concentricity.
7. Pack Loctite® FORM-A-THREAD® into gaps and voids.
8. Wipe off excess.
9. Allow to cure 30 minutes.
10. Pull component.
11. Clean the release compound from component O.D.
12. Roughen the housing I.D. and clean thoroughly.
13. Assemble with Loctite® QUICK METAL® 660 as required.
14. Recommended for light duty service.

EMERGENCY REPAIR ONLY!

Due to the nature of the damage, this should be considered a temporary repair until the unit can be replaced.

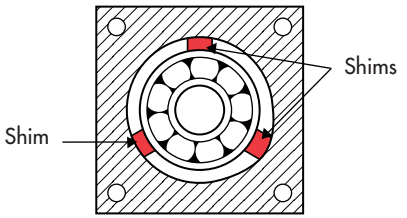
HOUSED COMPONENTS

COMPONENT CENTERING



EXCESSIVE / EVEN WEAR

1. Position the component in bore.
2. Select three equilateral mounting points.
3. Determine the radial gap at those points.
4. Select appropriate shim stock.
5. Cut three pieces approx. ⅛" wide to fit bore depth.
6. Bond the shims to bore at mounting points using Loctite® Black Max® **380 (480*)**.
7. Assemble per instructions page 26.



EXCESSIVE / UNEVEN WEAR

1. Position the component in bore.
2. Select three equilateral mounting points.
3. Determine the radial gap at those points.
4. Select and cut appropriate shim stock for each point.
5. Bond the shims to bore at mounting points using Loctite® Black Max® **380 (480*)**.
6. Assemble per instructions on page 27.

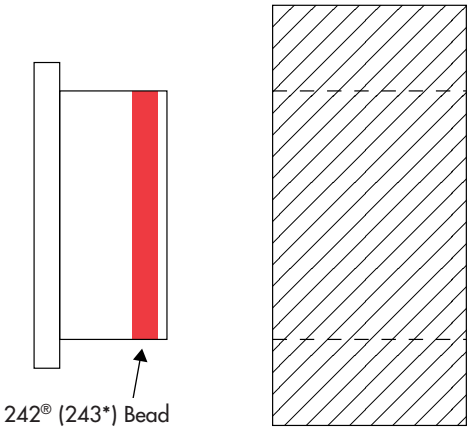
EMERGENCY REPAIR ONLY!

Due to the nature of the damage, this should be considered a temporary repair until the unit can be replaced.

** Worldwide or Application-Specific Alternative*

HOUSED COMPONENTS

SEALING/RETAINING – METALLIC SEAL



1. Clean the housing I.D. and seal O.D. with Loctite® ODC-Free Cleaner & Degreaser.
2. Spray both the housing and seal with Loctite® 7649 Primer N.
3. Apply a bead of Loctite® **242®** **(243*)** Threadlocker to the leading edge of metallic seal O.D.

   Note: Virtually any Loctite® Threadlocking product will work here. Low strength liquid is recommended due to normal gap and strength requirement.
4. Install as usual.
5. Wipe off excess.
6. Allow to cure 30 minutes.

Note:

- Loctite® 242® (243*) Threadlocker is normally used with worn seal housings to prevent leakage or slippage.
- It is not generally necessary to remove pre-applied sealant from seal O.D.

** Worldwide or Application-Specific Alternative*

RETAINING COMPOUNDS

LOCTITE® RETAINING COMPOUNDS QUICK SELECTOR

Application	Product	Primer
Shaft Mount – Press fit	Retaining Compound 609 (603*)	NONE
Shaft Mount – Slip Fit		
Small Gap (.002" Radial max.)	Retaining Compound 609 (603*)	N
Larger Gap (.010" Radial max.)	QUICK METAL® 660	N
Maximum Strength (.010" Radial max.)	Retaining Compound 680	T
Maximum Temperature (400°F) (.008" Radial max.)	Retaining Compound 620	T
Housing Mount – Press Fit		
Maximum Strength	Retaining Compound 609 (603*)	NONE
Low Strength	Threadlocker 242® (243*)	NONE
Housing Mount – Slip Fit		
Maximum Strength	Retaining Compound 680	NONE
High Strength	QUICK METAL® 660	NONE
Controlled Strength	QUICK METAL® 660	N
Low Strength	Threadlocker 242® (243*)	N

Note:

- Softer metals (Aluminum, Bronze, etc.) provide lower shear strengths than ferrous components.
- Excessive gap reduces shear strengths.
- Ideal surface finish — 50 to 80 rms.

Refer to Technical Data Sheets for more information.

** Worldwide or Application-Specific Alternative*

GUIDE TO SUCCESSFUL BONDING

I. JOB EVALUATION — Answer These Questions.

A. What materials are to be bonded? What kind of rubber, plastic, etc.? Porous? Slick? Rough?

B. What kind of service? Operating temperature? Impact? Moisture or water exposure?

C. What kind of stresses? Avoid peel or cleavage!

D. Is gap filling or bridging needed? How much?

E. What cure speed or "return to service" time is needed?

II. ADHESIVE SELECTION (See page 33.)

III. SURFACE PREPARATION

1. Part must be clean. No oil. No grease. No residue.
2. Remove paint from bond area for maximum strength.
3. Roughen smooth surfaces with emery cloth.
4. Treat selected "hard to bond" materials as directed:
   a. Polyethylene, etc. – Use Loctite® Prism® Primer 770 or 793.
   b. PTFE – Use appropriate etching agent.
5. Alcohol wipe parts cleaned with water-based "safety" cleaners.

IV. APPLICATION TECHNIQUES/TIPS

A. Read and follow adhesive package instructions.

B. Use the minimum amount of adhesive to one part only. Apply activator (if required) to other part.

C. Avoid "jiggling" mated parts. Apply clamp pressure if possible.

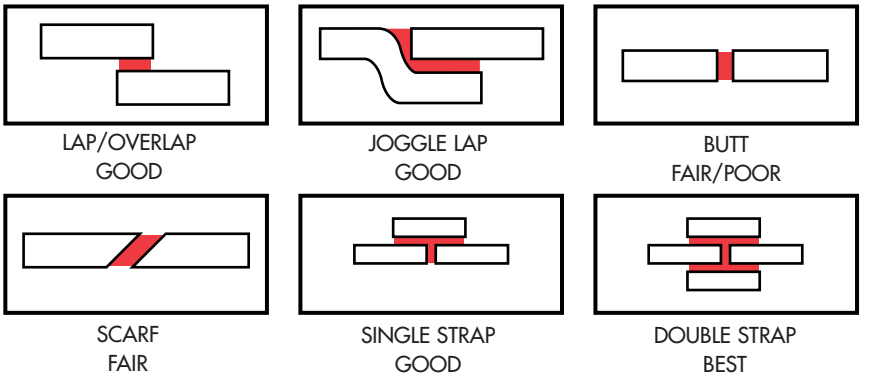
D. Allow maximum cure time possible. See technical data for recommended cure times.

V. QUESTIONS? Call Loctite Technical Information. See back cover for the Loctite Technical Information number in your area.

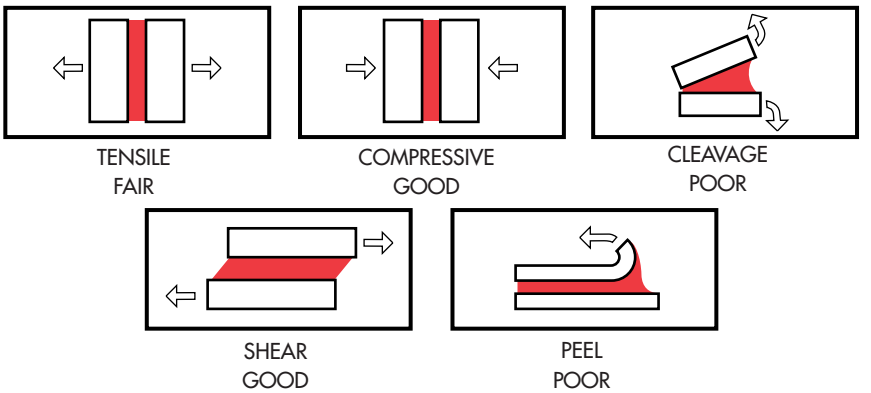
BONDING

PROPER JOINT DESIGN

TYPES OF JOINTS



TYPES OF STRESSES



DESIGN GUIDELINES

1. Maximize shear/minimize peel and cleavage.
2. Maximize compression/minimize tensile.
3. Joint width more important than overlap.

ADHESIVE QUICK SELECTOR

PRODUCT	TYPICAL APPLICATIONS
PRISM® 454 – A surface insensitive gel instant adhesive for common and "hard to bond" materials. Excellent for porous materials and large gaps.	Plastics, rubber, foam, ceramics, felt, cork, wood, etc.
BLACK MAX® 380 (480*) – A toughened instant adhesive for severe environments. Superior impact, temperature, and moisture resistance. Slightly slower fixturing (45-60 seconds).	Weatherstripping, name tags, pad mounts, etc.
TAK PAK® Accelerator 7452 or 712 – A spray mist for fast surface curing of all instant adhesives.	Tacking jumper wires on PC boards, strain relief, temporary jig placement, etc.
PRISM® Primer 770 – Permits bonding of polyethylene, polystyrene, etc. Allow 24 hour adhesive cure time for maximum strength.	Wear pads, bumpers, buckets, etc.
DEPEND® 330 – A structural acrylic adhesive used for general purpose, severe environments and less than optimum cleanliness applications. Works on most surfaces except rubber and polyethylene.	Sheet metal, glass, fiberglass, composites, wood, etc.
FIXMASTER® FAST CURE EPOXY – A two-part epoxy used in rough service, severe environments or large gap applications.	Casting or case repair, sealing punctures, pin holes, etc.

** Worldwide or Application-Specific Alternative*

RUSTPROOFING

OPTIMUM USE OF EXTEND® RUST TREATMENT

SURFACE PREPARATION — OLD STEEL:

Loose or "flaky" rust must be removed. Only conversion of firmly bonded rust will result in durable protection. Oil, grease, old paint, mill scale, form oil, fingerprints and water soluble surfaces and chlorides must be removed to allow Loctite® Extend® to react with rust.

Loose rust, mill scale and oil paint should be removed preferably by power wirebrushing, followed by rinsing with water to remove powder and solubles. Manual wirebrushing, chipping, scraping and particularly rotopeening can also be used. Oil, grease, form oil and fingerprints should be removed before loose rust. Ideal surfaces will show light rust as well as bare metal surfaces.

RUST CONVERSION TIME AND APPEARANCE:

Two coats of Loctite® Extend® are recommended.

On lightly rusted steel (that has been wirebrushed), the first coat will start to develop a violet color within 60 seconds. This will become satin to flat black in appearance. The second coat should dry to a satin black appearance.

On heavily rusted steel (that has been wirebrushed), the first coat should develop a purple-black color within seconds. The second coat should dry to a black color with gloss varying from flat to satin. The second coat should be applied within 15-30 minutes of the first coat.

APPLICATION CONDITIONS:

Loctite® Extend® may be applied when surface and air is between 50°F minimum and rising and 90°F maximum and falling. Reaction is slower at lower temperatures. If temperature is too hot, film may surface dry and bubble. High humidity is beneficial; it slows drying but assists rust conversion. Extend® should not be applied in conditions of condensing humidity (e.g. fog, dew), on ice, in rain or in heavy sea (salt) spray atmospheres. Steel surface may be damp but not wet (i.e. continuous visible film of water). DO NOT APPLY LOCTITE® EXTEND® TO SURFACES IN DIRECT SUNLIGHT.

APPLICATION EQUIPMENT METHODS:

Loctite® Extend® may be applied by brush, roller, or spray. Brush or roller is suitable for small areas. Avoid sags and ridges and keep edges wet by coating about a square yard at a time. Roll away from previously coated area then roll back. Do not pour unused material back into the original container. NEVER add solvents to Loctite® Extend®.

Spray application is recommended for larger areas. Airless spray equipment is faster, and provides more effective conversion due to improved surface penetration. Conventional air-spray equipment may be used, but Loctite® Extend® may require thinning up to 10% with water for proper spraying.

CLEANING

GENERAL-PURPOSE PARTS CLEANING

In general, Natural Blue® cleaning effectiveness is enhanced by:

a. Higher Natural Blue® Cleaner & Degreaser concentrations;
b. Longer cleaner on-part times;
c. Dilution with warm water (150°F to 180°F);
d. Agitation of parts or scrubbing.

DIRECTIONS

1. Dilute Natural Blue® concentrate with water to most economical/effectiveness level. See package labels for suggested ratios.
2. Spray, dip or wipe dilution onto parts or surface to be cleaned.
3. Soak parts or scrub (if needed).
4. Flush soil/cleaner mixture off of parts or surfaces with water.
5. Disposal: Natural Blue® contains no hazardous ingredients. It should be disposed of in accordance with state and local regulations and will not harm sewage treatment microorganisms. Once Natural Blue® is mixed with hazardous waste, it must be treated as hazardous waste and disposed of accordingly.

Note: Loctite® ODC-Free Cleaner & Degreaser is recommended for cleaning substrates before Loctite® machinery adhesive use.

HAND CLEANING

For fast, effective hand cleaning without skin-irritating petroleum solvents, use LOCTITE® ORANGE Natural Citrus Hand Cleaner. Available with or without pumice, in cream or lotion formula, LOCTITE® ORANGE waterless hand cleaner removes grease, grime, paint, oil and ink and contains aloe and lanolin to keep hands from cracking and drying out. It's even biodegradable.

TROUBLESHOOTING

1. What type failure is occurring? Has the application worked before?
2. Was proper and adequate adhesive/sealant used?
3. Was proper and adequate primer/activator used?
4. Do service conditions exceed the capability of the adhesive sealant?
   (a) operating temperature (c) fluid compatibility
   (b) excessive pressure too soon (d) impact on environment (instant adhesives)
5. Were parts adequately cleaned prior to applying adhesive?
   Note: If adhesive failure, is cured residue on one or both parts? If one part is bare, check that part for contamination.
6. Were proper assembly techniques utilized?
7. Was adhesive/sealant allowed adequate cure time prior to service?
8. Do assembly/part conditions exceed capability of the adhesive/sealant?
   (a) excessive gaps (c) improper joint design
   (b) component materials (d) inadequate clamping/fixturing
9. If additional assistance is required, please call our LOCTITE TECHNICAL INFORMATION LINE. See back cover for the Loctite Technical Information number in your area.

Note: Reference Materials
a. Product selection, cure times, gap fill, etc.; use Product Selector Slide Rule (LT-776)
b. Fluid Compatibility Chart (LT-836)

LIMITATION OF WARRANTY

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof.

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ORDERING

PRODUCT LISTING/ORDER INFO.

CATEGORY	SIZE	ITEM NO.
THREADLOCKERS		
222MS SMALL SCREW	10 ml bottle	22221
	50 ml bottle	22231
	250 ml bottle	22241
242® REMOVABLE	10 ml bottle	24221
	50 ml bottle	24231
	250 ml bottle	24241
243 REMOVABLE	10 ml bottle	24077
	50 ml bottle	24078
	250 ml bottle	24079
262 PERMANENT	10 ml bottle	26221
	50 ml bottle	26231
	250 ml bottle	26241
277 LARGE STUD	10 ml bottle	21434
	50 ml bottle	27731
	250 ml bottle	27741
290 WICKING	10 ml bottle	29021
	50 ml bottle	29031
	250 ml bottle	29041
THREAD SEALANTS		
545 HYDRAULIC/PNEUMATIC SEALANT	10 ml bottle	32439
	50 ml bottle	54531
	250 ml bottle	54541
564 LOWER STRENGTH	50 ml tube	28754
	250 ml tube	28755
565 CONTROLLED STRENGTH	50 ml tube	56531
	250 ml tube	56541
	300 ml cartridge	56571
567 HIGH TEMPERATURE	50 ml tube	56747
	250 ml tube	56765
	16 oz. brush top	33241
RETAINING COMPOUNDS		
609 GENERAL PURPOSE	10 ml bottle	60921
	50 ml bottle	60931
	250 ml bottle	60941
620 HIGH TEMPERATURE	10 ml bottle	62015
	50 ml bottle	62040
	250 ml bottle	62070
660 QUICK METAL® PRESS FIT REPAIR	6 ml tube	66010
	50 ml tube	66040
	250 ml tube	30287
680 HIGH STRENGTH/HIGH VISCOSITY	10 ml bottle	68015
	50 ml bottle	68035
	250 ml bottle	68060

ORDERING

PRODUCT LISTING/ORDER INFO.

CATEGORY	SIZE	ITEM NO.
GASKETING		
510 GASKET ELIMINATOR® HIGH TEMPERATURE	50 ml tube	51031
	250 ml tube	51041
515 GASKET ELIMINATOR®	6 ml tube	51517
	50 ml tube	51531
	300 ml cartridge	51580
518 GASKET ELIMINATOR®	6 ml tube	51817
	50 ml tube	51831
	300 ml cartridge	51845
MASTER GASKET® KIT	25 ml syringe	22423
	300 ml cartridge	22424
INSTANT GASKET	4 oz. can	30684
	5 oz. cartridge	30509
	7 oz. can	30507
598 BLACK RTV SILICONE GASKET MAKER	70 ml tube	59830
	8.75 oz. can	59866
	300 ml cartridge	59875
587 BLUE RTV SILICONE GASKET MAKER	70 ml tube	58730
	8.75 oz. can	30567
	300 ml cartridge	58775
5920 COPPER RTV SILICONE GASKET MAKER	70 ml tube	30542
	300 ml cartridge	82046
5699 GREY RTV SILICONE GASKET MAKER	70 ml tube	18718
	300 ml cartridge	18581
ADHESIVES		
330 DEPEND® NO-MIX	25 ml syringe kit	20251
	250 ml tube kit	20252
	250 ml tube	33058
	300 ml cartridge	33064
380 BLACK MAX® TOUGHENED	3 gm tube	38004
	1 oz. bottle	38050
	1 lb. bottle	38061
404 QUICK SET™	1/3 oz. bottle	46551
	4 oz. bottle	46548
	1 lb. bottle	46561
454 PRISM® SURFACE INSENSITIVE GEL	3 gm tube	45404
	20 gm tube	45440
	300 gm cartridge	45478
480 PRISM® TOUGHENED	20 gm bottle	48040
	1 lb. bottle	48061
FIXMASTER® FAST CURE EPOXY	10-4 gm cups	21425
	10-1 oz. cups	21426

ORDERING

PRODUCT LISTING/ORDER INFO.

CATEGORY	SIZE	ITEM NO.
PRIMERS		
7471 PRIMER T (Acetone)	1.75 fl. oz. bottle	19267
	4.5 oz. aerosol	22477
7649 PRIMER N (Acetone)	25 gm aerosol	21347
	1.75 fl. oz. bottle	19269
	4.5 oz. aerosol	21348
770 PRISM® PRIMER (Heptane)	1.75 fl. oz. bottle	18396
712 TAK PAK® ACCELERATOR (Isopropyl Alcohol)	1.75 fl. oz. bottle	20352
7452 TAK PAK® ACCELERATOR (Acetone)	1.75 fl. oz. bottle	18580
LUBRICANTS		
C5-A® COPPER ANTI-SEIZE	8 oz. brush top	51147
	1 lb. brush top	51007
	12 oz. aerosol	51003
NICKEL ANTI-SEIZE	8 oz. brush top	77124
	1 lb. brush top	77164
	12 oz. aerosol	51286
SILVER GRADE ANTI-SEIZE	8 oz. brush top	76732
	1 lb. brush top	76764
	12 oz. aerosol	76759
CLEANERS		
LOCTITE® ORANGE pumice formula (lotion)	7.5 fl. oz. bottle	25108
	15 fl. oz. bottle	25116
	1 gallon pump	25218
LOCTITE® ORANGE smooth formula (lotion)	7.5 fl. oz. bottle	23108
	15 fl. oz. bottle	23116
	1 gallon pump	23218
LOCTITE® ORANGE pumice formula (cream)	14 oz. tub	35013
LOCTITE® ORANGE smooth formula (cream)	14 oz. tub	33013
NATURAL BLUE® CLEANER & DEGREASER	24 fl. oz. spray	82249
	1 gallon bottle	82251
ODC-FREE CLEANER & DEGREASER	15 oz. aerosol	22355
	16 fl. oz. pump spray	20162
GENERAL MAINTENANCE		
EXTEND® RUST TREATMENT	10.25 oz. aerosol	30539
	1 quart bottle	75430
	1 gallon bottle	75448
FORM-A-THREAD® STRIPPED THREAD REPAIR	4.8 ml syringe	28654
O-RING SPLICING KIT	Kit	00112

For product availability, technical information and material safety data sheets (MSDS) call:

Loctite Corporation, U.S.A.
1001 Trout Brook Crossing
Rocky Hill, CT 06067
1-800-LOCTITE (562-8483)

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Mississauga, Ontario L5N 7P2
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Loctite Company de México, S.A. de C.V.
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Loc. Tulpetlac, C.P. 55090
Ecatepec de Morelos, Edo. de México, México
01-800-849-9412

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