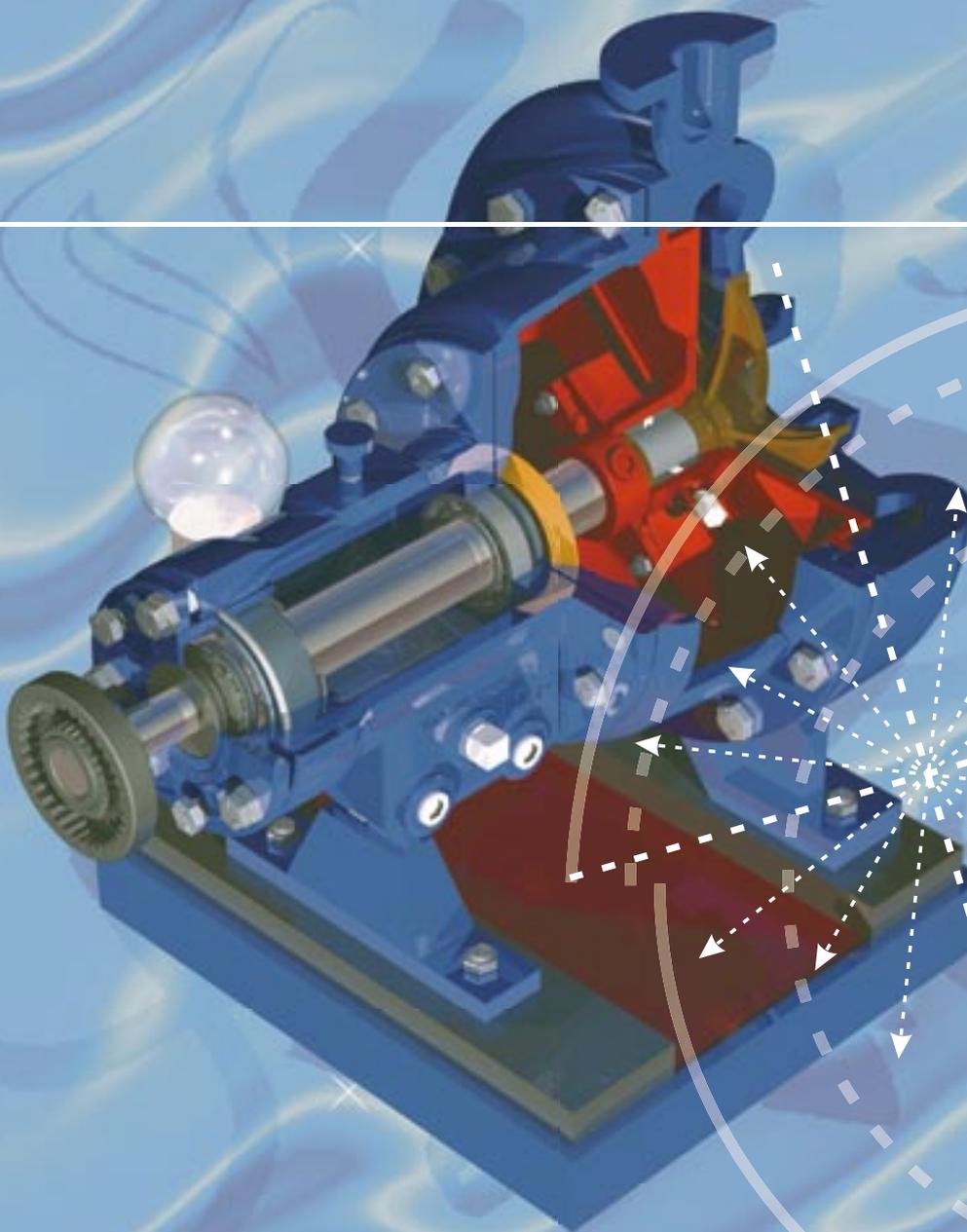


**LOCTITE**<sup>®</sup>

# Industrial Pumps Rebuild and Maintenance Guide



**Henkel**





This guide has been developed to assist maintenance personnel achieve increased reliability, longevity and cost reduction of centrifugal pumps.

Industrial centrifugal pumps represent significant capital value and it is therefore important to extend their operational lives whilst optimising efficiency and reliability.

Proactive maintenance can help achieve these objectives by reducing the risk of breakdowns, and ultimately extending the Mean Time Between Failure (MTBF). Without proactive maintenance, some pumps failures will be unnoticed until an inevitable breakdown.

Pump breakdowns may result in a shut down of production and can be more expensive to repair or replace. Many of these breakdowns are the result of simple, preventable failures, such as the loss of clamp load between two assemblies caused by a loose fastener. This loss of clamp load could lead to misalignment and ultimately cause bearing failure.

Loctite technologies have been helping OEMs around the world prevent common failures and extend end-product life. These same technologies, used by the people who maintain equipment, offers a product solution for all stages of pump maintenance.

## Stages of Pump Maintenance



We have chosen a Goulds 3196 pump to illustrate common failures, challenges and Loctite technology solutions, throughout this guide. Similar solutions will apply to other types and brands of centrifugal pumps.

Contact your local Henkel Application Engineer if help is needed for your specific applications

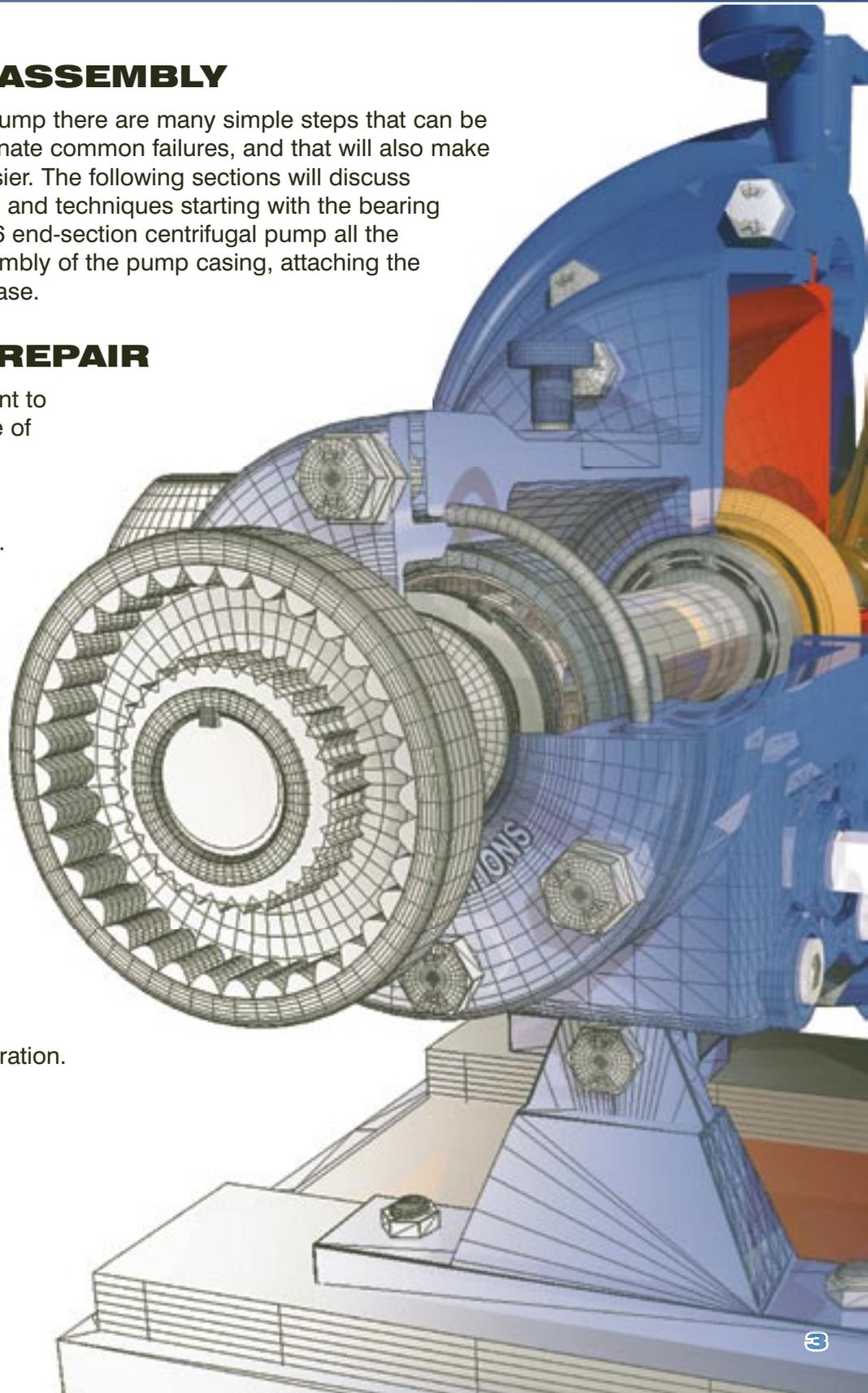
**Phone: Australia - 1300 88 555 6, New Zealand (09) 272-6710**  
**Internet: [www.loctite.com.au](http://www.loctite.com.au) or [www.loctite.co.nz](http://www.loctite.co.nz)**

## Part 1: PUMP ASSEMBLY

During the assembly of a pump there are many simple steps that can be taken to help reduce or eliminate common failures, and that will also make future disassembly much easier. The following sections will discuss proven reliability applications and techniques starting with the bearing housing of the common 3196 end-section centrifugal pump all the way through to the final assembly of the pump casing, attaching the coupling, and grouting the base.

## Part II: PUMP REPAIR

Repairs are a critical element to pump maintenance. Because of the harsh environments and operating parameters, pump parts are subject to wear, erosion, corrosion, leaks, etc. In addition to preventative measures, Loctite® technologies can be used to restore pump parts. Alternative solutions such as scrap and replacement or the use of other repair technologies may be too costly. Using Loctite® technologies to restore parts is a very cost-effective solution because users can be assured of the consistent quality, performance, availability and support that is provided and expected from Henkel Corporation.





## PUMP ASSEMBLY

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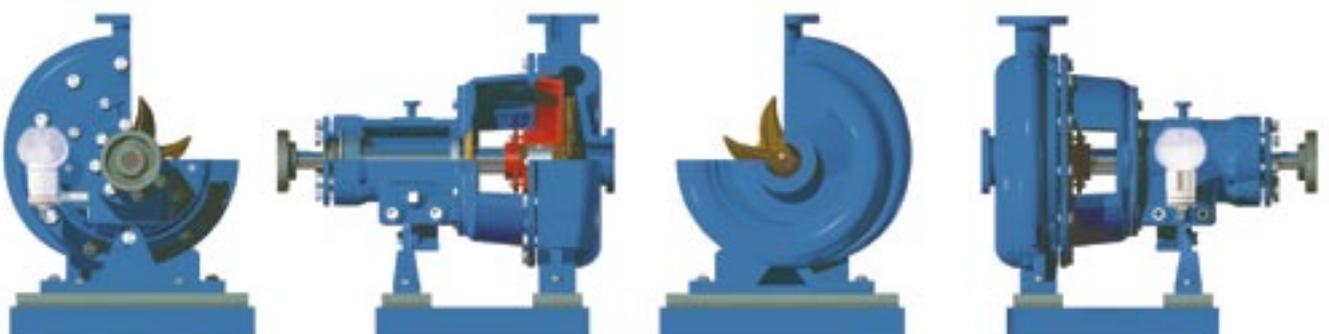
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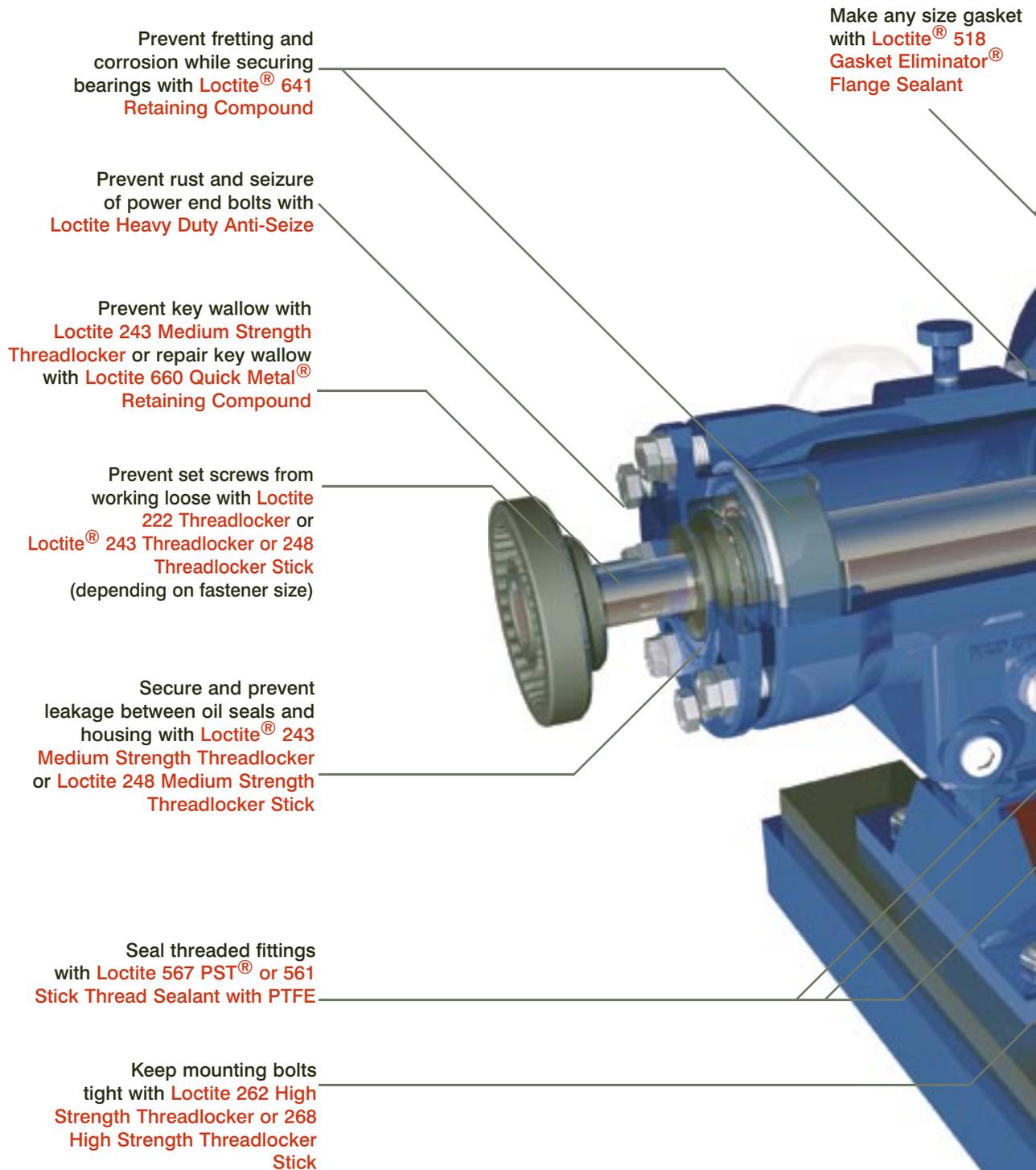
## PRODUCT INFORMATION

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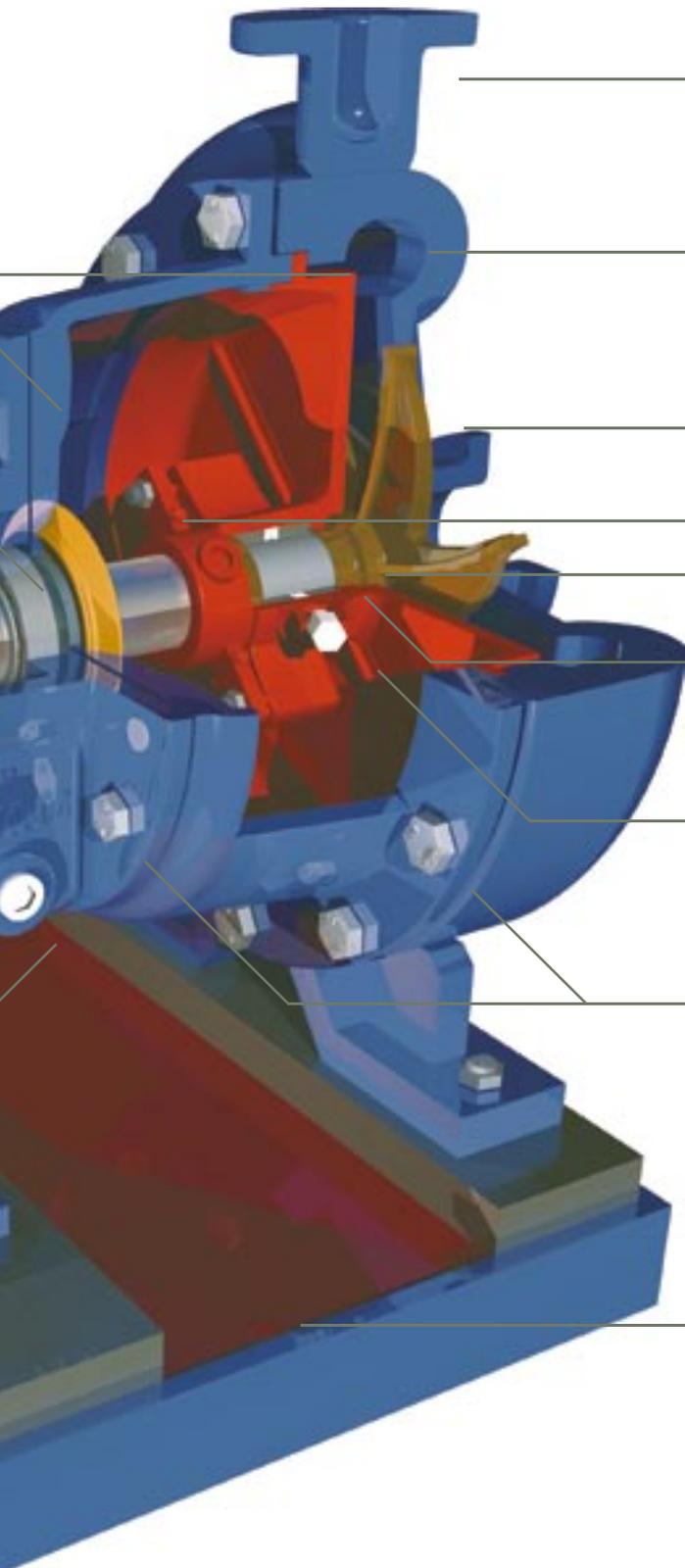
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# INDUSTRIAL PUMP APPLICATIONS

## section 1.1 PUMP ASSEMBLY



Protect pump against chemical attack and erosion with **Loctite® Nordbak® Chemical Resistant Coating**

Rebuild and protect worn volutes with **Loctite Nordbak Wearing Compound** and/or **Loctite Nordbak Brushable Ceramic**

Restore, coat, and protect impeller vanes with **Loctite Nordbak Brushable Ceramic**

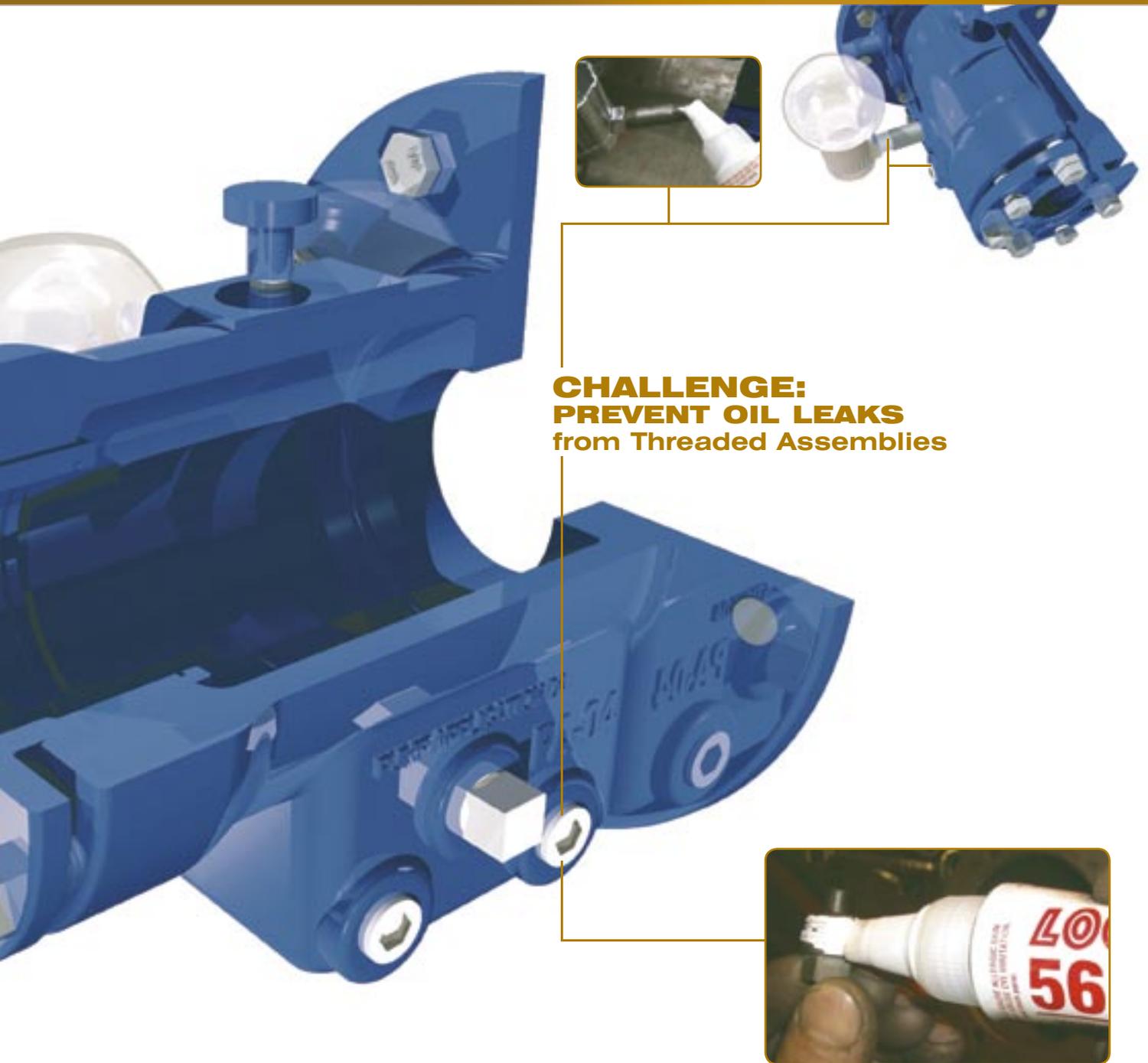
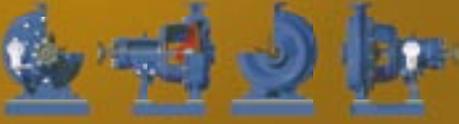
Prevent corrosion and seizure of gland assembly nuts and seizure of the impeller to the shaft with **Loctite Heavy Duty Anti-Seize**

Rebuild worn shafts with **Loctite® Fixmaster® Superior Metal**

Seal and protect flushing connectors with **Loctite 567 PST® Thread Sealant with PTFE**

Prevent corrosion and secure casing bolts and adapter bolts with **Loctite 243 Medium Strength Threadlocker** or **248 Medium Strength Threadlocker Stick**.

Repair mounting base with **Loctite Fixmaster Magna-Crete**



**CHALLENGE:**  
**PREVENT OIL LEAKS**  
from Threaded Assemblies



Step #2. Apply Loctite 567 PST Thread Sealant with PTFE

**CAUSE:**

- Drain plugs, oiler nipples, fittings, etc. all have air space between the threads and can weep oil out from the bearing housing.
- Constant pressure changes within the bearing housing can force these threaded assemblies to leak.

### SOLUTION:

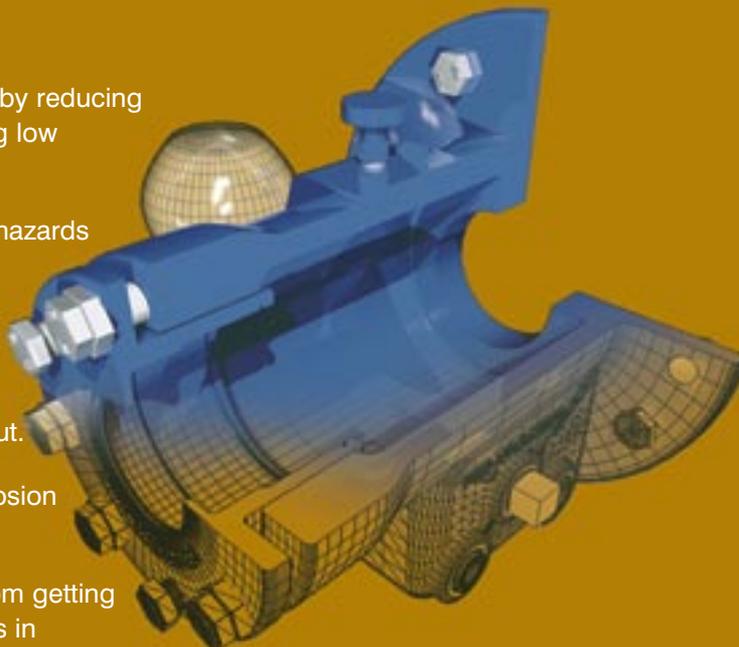
- Seal threaded assemblies with Loctite® 567 PST® Thread Sealant with PTFE\*.
- Loctite 567 PST Thread Sealant with PTFE is designed to cure only when enclosed in metal, such as in a threaded assembly.
- Once cured, moisture and oil cannot penetrate this barrier as the pressure changes within the bearing housing.
- The thread sealant prevents fittings from loosening, yet allows for easy disassembly with normal hand tools.

### STEPS:

1. Clean parts of contamination. If necessary, spray Loctite® 7649 Primer N onto threaded parts (male and female). Allow to dry.
2. Apply a band of Loctite 567 PST Thread Sealant with PTFE\* to male threads starting one to two threads from end of fitting.
3. Assemble parts as per OEM specifications.

### RESULTS:

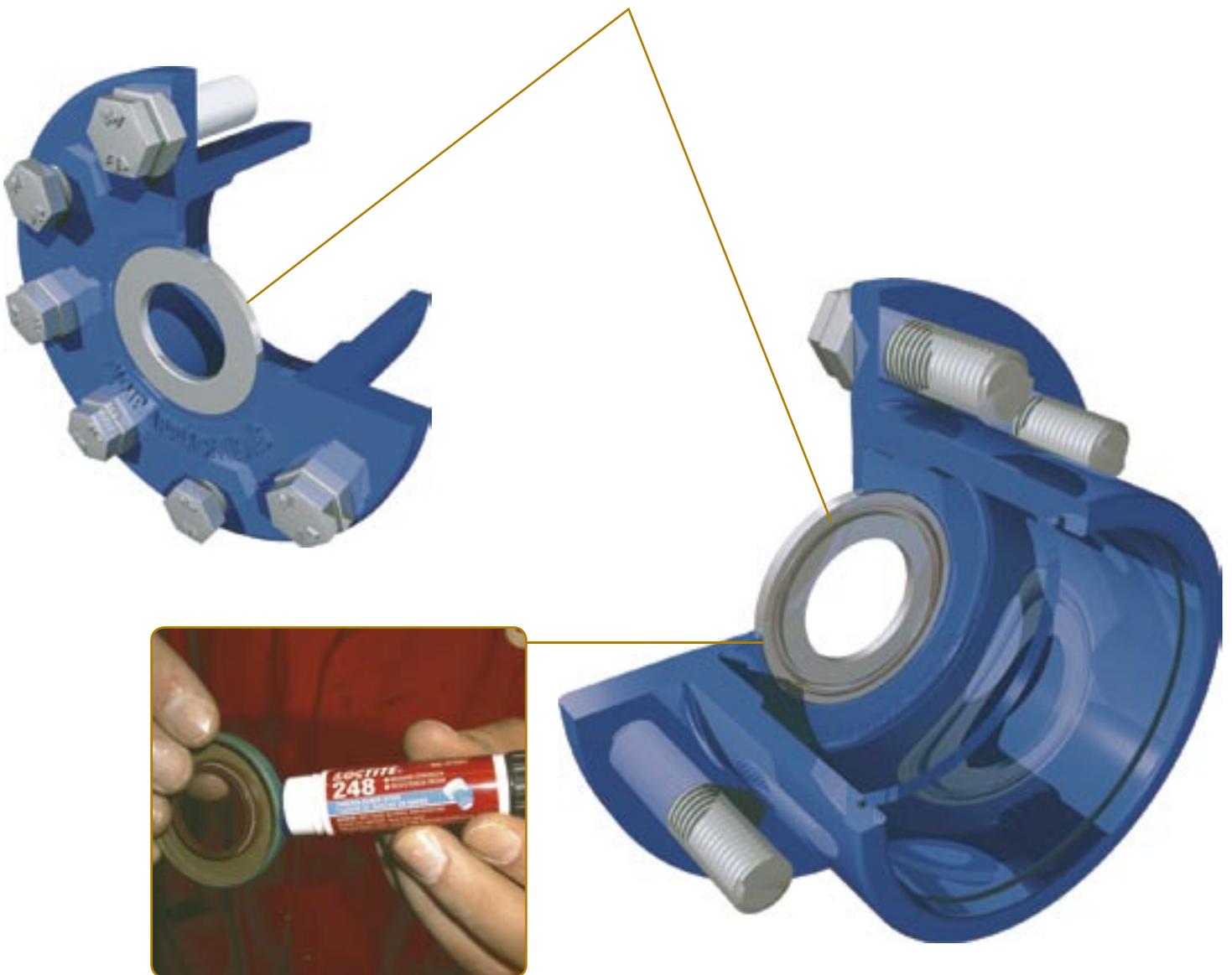
- Less oil consumption, thereby reducing the risk of the pump running low on lubricant.
- Elimination of the potential hazards and clean up associated with oil leaks.
- Elimination of seized fittings because moisture and air have been sealed out.
- Elimination of rust and corrosion within the thread space.
- Contaminants prevented from getting into the oil through the gaps in the threads.



\* See product table on page 58 for a list of alternative Loctite® solutions.



**CHALLENGE:**  
**PREVENT LEAKS AND SEIZURES**  
Between the Bearing Housing and Oil Seal



Step #2. Apply Loctite 248 Medium Strength Threadlocker Stick

**CAUSE:**

- As with any press fit, there are small air spaces between the housing and the oil seal. This air space can create a leak path where corrosion can form.

### **SOLUTION:**

- Fill the air spaces by applying a Loctite® Medium Strength Threadlocker to the outside diameter of the oil seal.

### **STEPS:**

1. Clean the outside diameter of the oil seal and the inside diameter of the bearing housing with Loctite® ODC-Free Cleaner & Degreaser.
2. Apply Loctite 248 Medium Strength Threadlocker Stick to the outside diameter of the oil seal.
3. Wipe off any excess and press into housing using normal techniques.

### **RESULTS:**

- A sealed assembly eliminates leaks, contamination, and corrosion.
- Elimination of clean up and hazards associated with oil seal leaks.
- Less oil consumption.
- Reduced risk of running low on lubricant.
- Service of the pump is easier.
- The oil seal can be easily removed with a screwdriver during the next overhaul.



\* See product table on page 58 for a list of alternative Loctite® solutions.



**CHALLENGE:**  
**PREVENT CORROSION AND SEIZURE**  
of Power End Jack Bolts, Jam  
Nuts and Clamp Bolts



Step #1. Apply Loctite Silver Grade Anti-Seize.

**CAUSE:**

- Any exposed metal parts on a pump that are not stainless or coated, such as power end nuts and bolts, are subject to rust. When rust forms within the air space between the threads, the bolts will seize in place.

### **SOLUTION:**

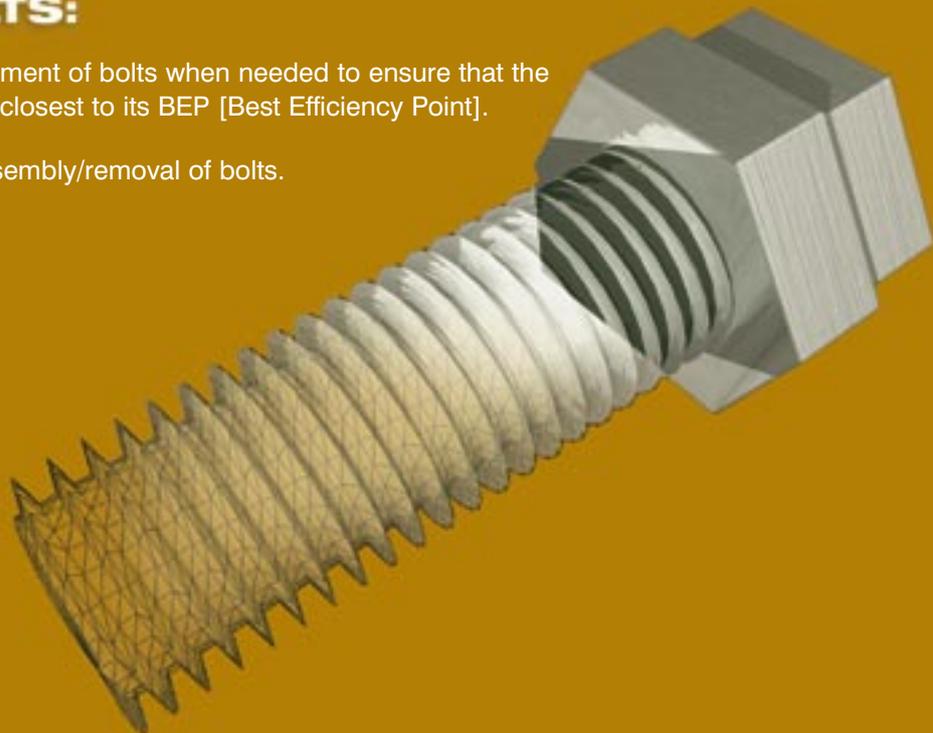
- Apply Loctite<sup>®</sup> Silver Grade Anti-Seize\* to the power end bolts.
- Loctite Silver Grade Anti-Seize is general purpose and protects parts up to 870°C

### **STEPS:**

1. Apply Loctite Silver Grade Anti-Seize liberally to the bolt threads.
2. Assemble jam nuts onto the bolts.
3. Thread the bolts into the bearing housing and adjust as required.

### **RESULTS:**

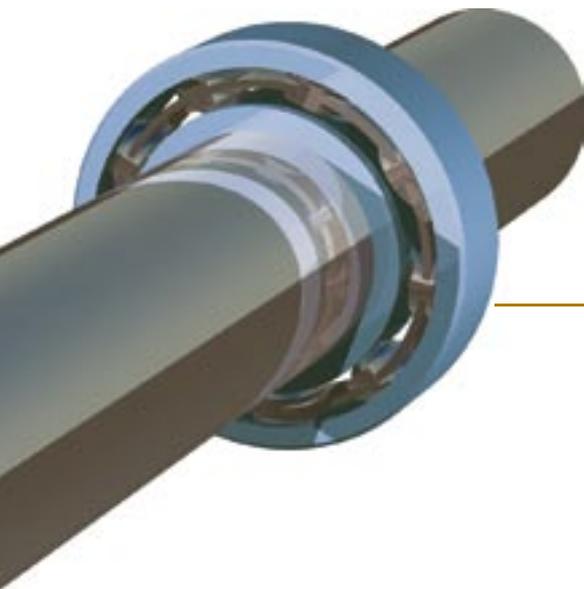
- Easy adjustment of bolts when needed to ensure that the pump runs closest to its BEP [Best Efficiency Point].
- Easy disassembly/removal of bolts.



\* See product table on page 58 for a list of alternative Loctite<sup>®</sup> solutions.



Step #2. Apply Loctite 641 Retaining Compound.



**CHALLENGE:  
PREVENT BEARING SPINOUT,  
Corrosion and Component Damage**



Step #2. Apply Loctite 641 Retaining Compound

**CAUSE:**

- Bearings are prone to spinning either on their shafts or within their housings, resulting in damage to these parts regardless of whether or not they have been pressed, shrink or slip fitted in place.
- The air space that exists between a bearing and shaft is an area where rust can form and cause damage to the parts.

### **SOLUTION N°1:**

- Apply a coating of Loctite® 641 Retaining Compound\* to the outside diameter of the outboard bearing.
- Loctite 641 Retaining Compound is low strength, which allows for easy disassembly during future overhauls.

### **STEPS:**

1. Clean parts with Loctite ODC-Free Cleaner & Degreaser.
2. Apply a coating of Loctite 641 Retaining Compound to the outside diameter of the outboard bearing.
3. Assemble using normal techniques.

### **SOLUTION N°2:**

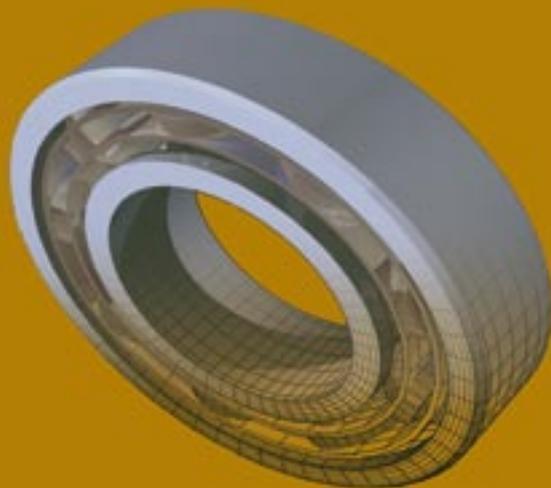
- Inboard Bearing – Apply Loctite 641 Retaining Compound\* to the inside diameter of the inboard bearing.

### **STEPS:**

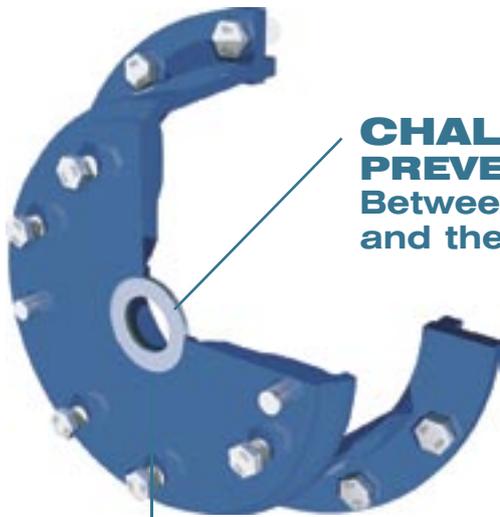
1. Clean parts with Loctite ODC-Free Cleaner & Degreaser.
2. Apply a bead of Loctite 641 Retaining Compound to the circumference of the shaft at the leading area of engagement.
3. Press the bearing onto the shaft using normal techniques.
4. Wipe off any excess material.

### **RESULTS:**

- Shaft and/or bearing housing damage is eliminated.
- Bearings are easily removed with standard tools.
- Corrosion (the brown smudge left on a shaft after a bearing has been removed is rust) is eliminated because the air space between the bearing and the shaft or housing is sealed.



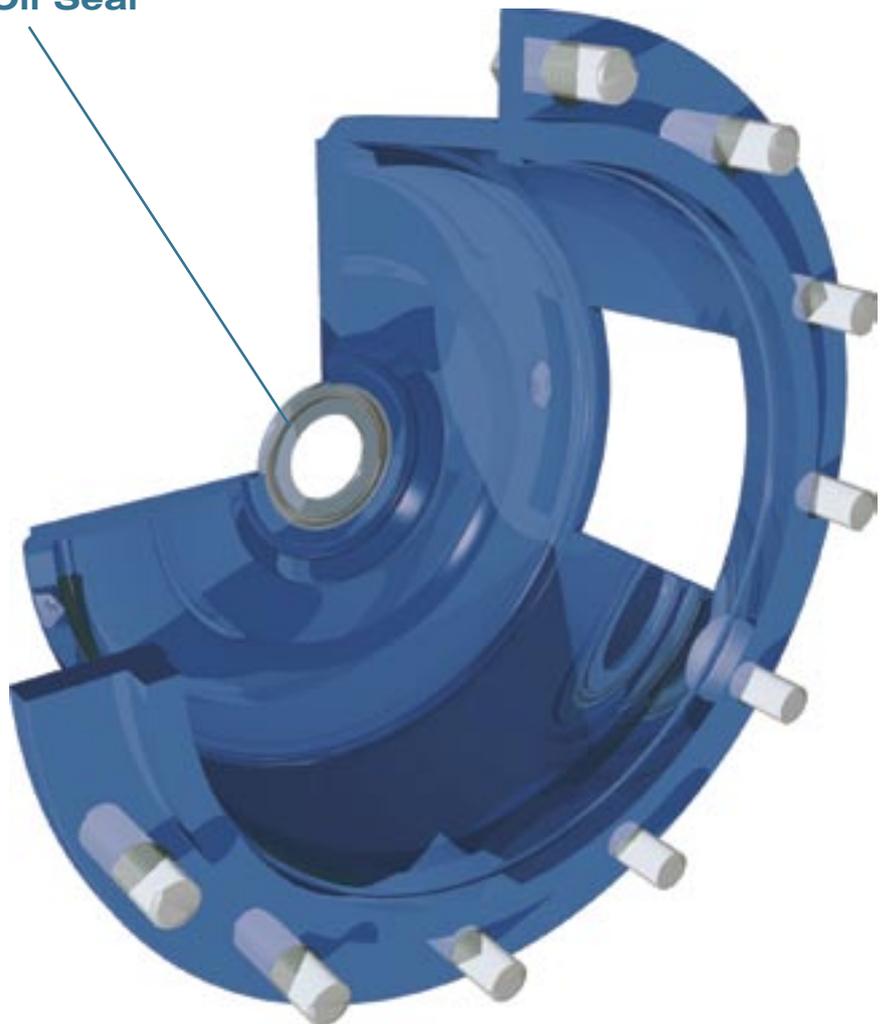
\* See product table on page 58 for a list of alternative Loctite® solutions.



**CHALLENGE:**  
**PREVENT OIL LEAKS**  
Between the Frame Adapter  
and the Oil Seal



Step #2. Apply Loctite 248 Medium Strength Threadlocker Stick



**CAUSE:**

- The small air spaces between the adapter and the oil seal can allow oil to leak.

### **SOLUTION:**

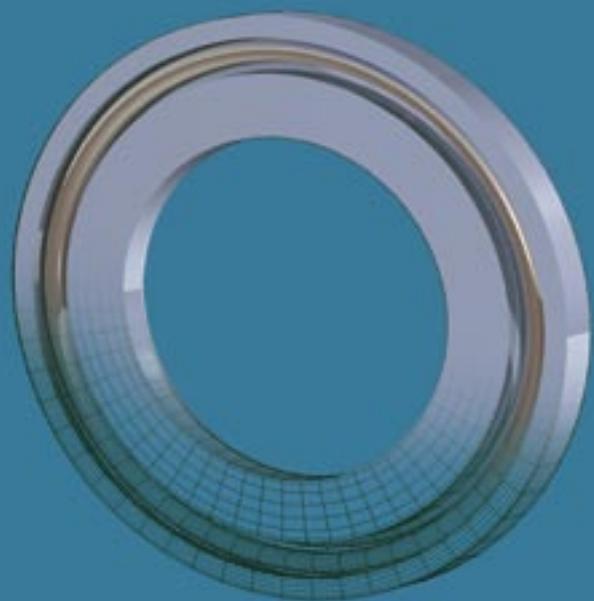
- Fill the air by applying a Loctite® Medium Strength Threadlocker\* to the outside diameter of the oil lip seal.
- A Loctite® Medium Strength Threadlocker allows the oil seal to be easily removed with a screwdriver during the next overhaul.

### **STEPS:**

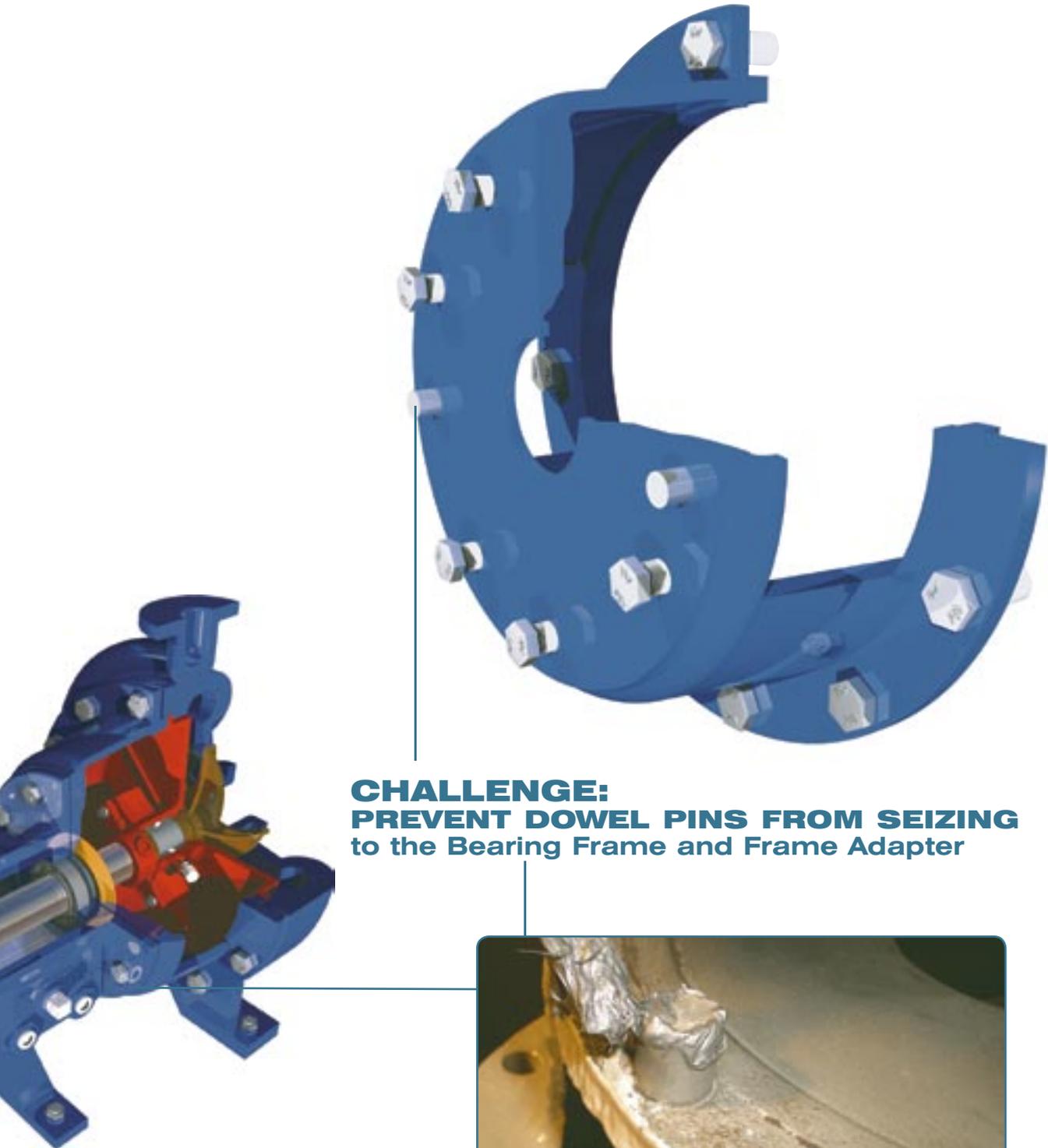
1. Clean the outside diameter of the oil seal and the inside diameter of the frame adapter with Loctite® ODC-Free Cleaner & Degreaser.
2. Apply Loctite® 248 Medium Strength Threadlocker Stick to the outside diameter of the oil seal.
3. Wipe off any excess and press into the adapter using normal techniques and tools.

### **RESULTS:**

- Elimination of leaks along with associated clean up and hazards.
- Less oil consumption.
- Reduced risk of running low on lubricant.
- Ease of pump service.
- Elimination of leaks, contamination and corrosion due to a unitized assembly.



\* See product table on page 58 for a list of alternative Loctite® solutions.



**CHALLENGE:**  
**PREVENT DOWEL PINS FROM SEIZING**  
to the Bearing Frame and Frame Adapter



Step #2. Apply Loctite Heavy Duty Anti-Seize.

### CAUSE:

- The dowel pins are exposed to the exterior pump environment and if not protected can rust and seize themselves to the bearing frame. When these pins seize in the bearing frame the disassembly becomes very difficult.

### SOLUTION

- **Before assembly, apply Loctite® Heavy Duty Anti-Seize\* to the dowel pins.**
- Loctite® Heavy Duty Anti-Seize Compound provides a protective coating to parts that are exposed to severe heat and moisture.

### STEPS:

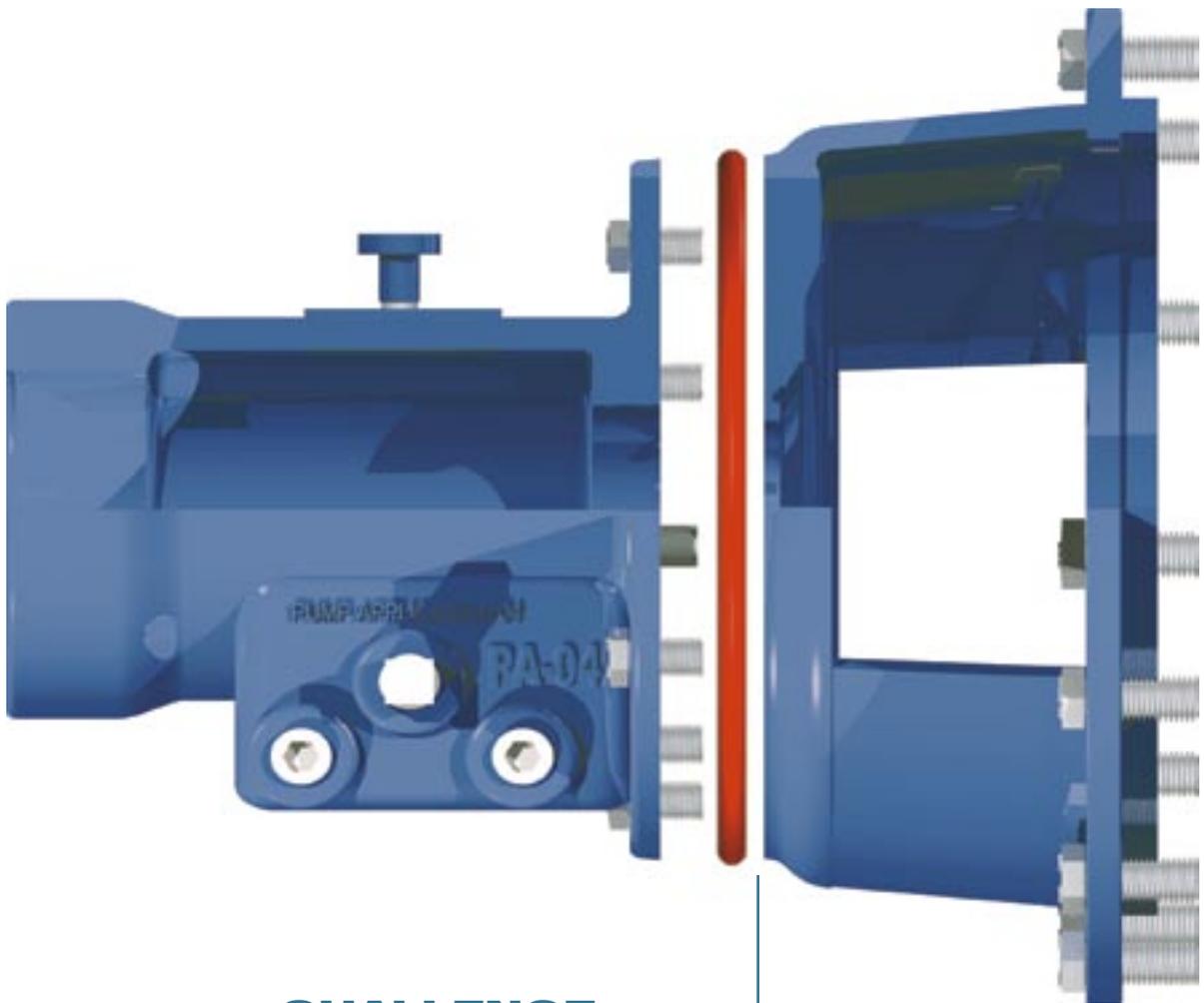
1. Clean the parts.
2. Apply Loctite Heavy Duty Anti-Seize to the pins.
3. Assemble adapter to the bearing frame.

### RESULTS:

- Prevention of rust and seizure of these close fitting parts.
- The bearing frame and frame adapter will be easier to separate during the next disassembly.



\* See product table on page 58 for a list of alternative Loctite® solutions.



**CHALLENGE:**  
**PREVENT GASKET FAILURE**  
Between the Bearing Frame  
and Frame Adapter

**CAUSE:**

- Leaks occur because a cut gasket can relax over time, resulting in loss of clamp load between the two flanges.
- Cut gaskets can also leak because they are prone to extrusion, misalignment, shrinkage, and breaks.
- Flange imperfections can be leak paths that a cut gasket may not be able to seal over time.



Step #4. Apply Loctite 518 Master Gasket Flange Sealant.

### SOLUTION:

- Apply Loctite® 518 Master Gasket™ Flange Sealant\* to the flange face of the frame adapter.
- The Loctite 518 Master Gasket Flange Sealant not only eliminates the gasket but also eliminates all the failure modes of cut gaskets, and most importantly, it seals all of the air space between the two parts.

**Note:** In some cases the cut gasket is required for spacing. In this case, apply Loctite 518 Master Gasket Flange Sealant to both sides of the gasket as a shellac.

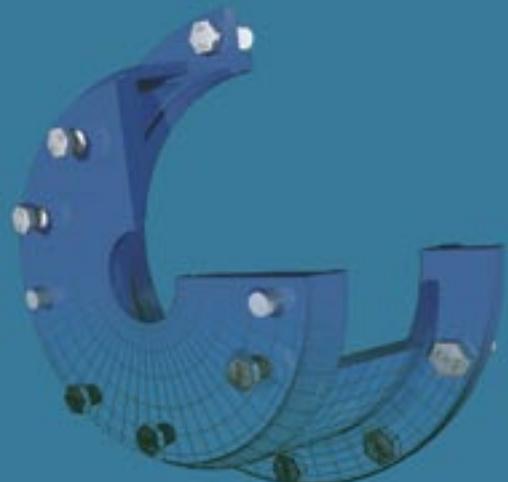
- Loctite 518 Master Gasket Flange Sealant can cure through fairly large gaps and surface imperfections.

### STEPS:

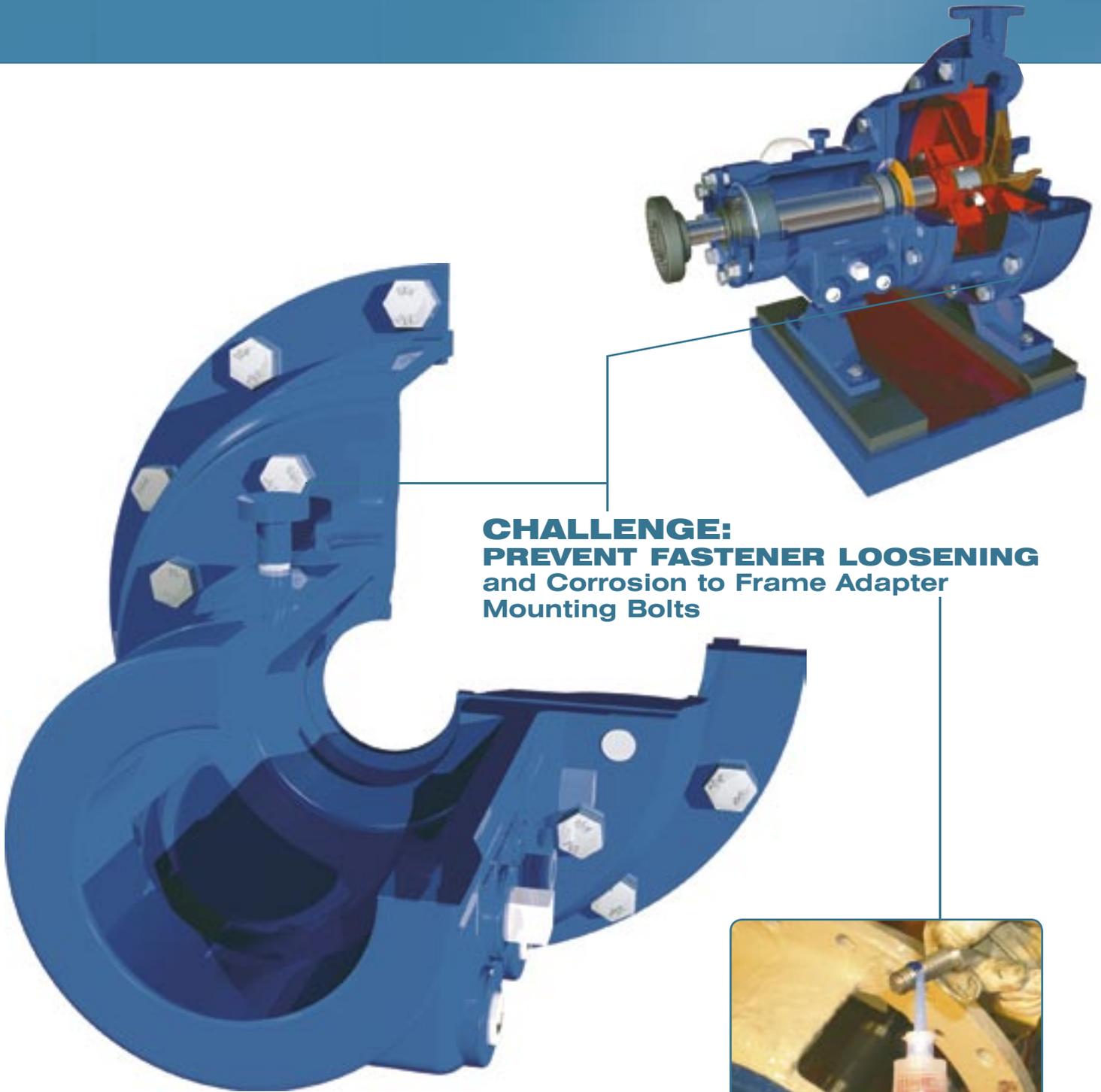
1. Remove old gasketing material and other heavy contaminants with Loctite® Chisel Gasket Remover.
2. Clean both flange surfaces with Loctite® ODC-Free Cleaner & Degreaser.
3. Spray Loctite 7649 Primer N on only one flange surface and allow to dry.
4. Apply a continuous bead of Loctite 518 Master Gasket Flange Sealant to the other surface.  
**Note:** Circle bolt holes with sealant if appropriate.
5. Assemble parts and tighten as required.
6. Allow to cure:
  - No pressure – immediate service
  - Low pressure (up to 500 psi) – 30 to 45 minutes
  - High pressure (500 to 2500 psi) – 4 hours
  - Extreme high pressure (2500 to 5000 psi) – 24 hours

### RESULTS:

- Elimination of common cut gasket failures such as compression set, shrinkage, relaxation, and breaks.
- Constant clamp load is ensured.
- Reliable seal.
- Elimination of oil leaks between the bearing frame and frame adapter, along with associated clean up costs and hazards.
- Reduced oil consumption.
- Reduced risk of running low on oil.



\* See product table on page 58 for a list of alternative Loctite® solutions.



**CHALLENGE:**  
**PREVENT FASTENER LOOSENING**  
and Corrosion to Frame Adapter  
Mounting Bolts



Step #2. Apply Loctite 243 Medium Strength Threadlocker.

### CAUSE:

- Bolts can work themselves loose because they are always under strain caused by torque. Also, vibration, thermal expansion and contraction, and shock all contribute to loosening and reduction of clamp load.

### SOLUTION:

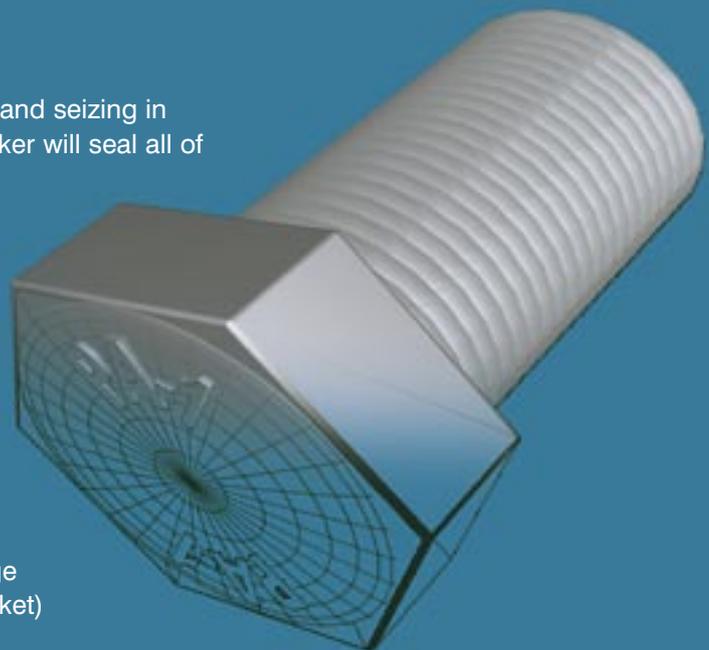
- Apply a **Loctite® Medium Strength Threadlocker\*** to the frame adapter bolts.

### STEPS:

1. Clean threads with Loctite® ODC-Free Cleaner & Degreaser.
2. Apply several drops of Loctite® 243 Medium Strength Threadlocker to the adapter bolts.
3. Assemble and tighten as usual.

### RESULTS:

- Prevention of the bolts from rusting and seizing in place because a Loctite® threadlocker will seal all of the air space within the threads.
- Easy and consistent disassembly.
- Prevention of bolts from loosening.
- Torque and clamp load is maintained.
- Proper clamp load is ensured between flange surfaces (when Loctite® 518 Master Gasket™ Flange Sealant is used instead of a cut gasket) which eliminates leaks.



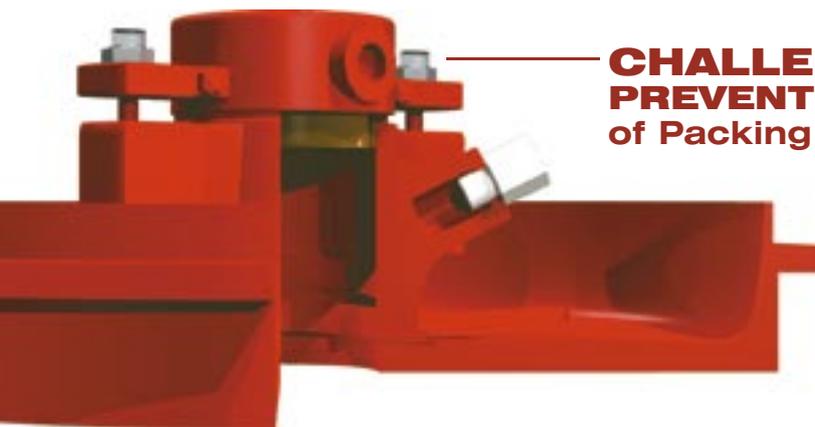
\* See product table on page 58 for a list of alternative Loctite® solutions.



Step #2. Apply Loctite Heavy Duty Anti-Seize.



**CHALLENGE:  
PREVENT CORROSION AND SEIZURE  
of Packing Gland Nuts**



**CAUSE:**

- The gland assembly is subject to severe corrosion and seizure because of the continuous flow of water that lubricates and cools the packing. This continuous flow of water also causes the gland studs and nuts to rust and seize.
- If the nuts seize to the studs, it becomes impossible to properly adjust the gland follower and ultimately, proper lubrication and cooling cannot be maintained. This can lead to the packing running dry, overheating and subsequent wearing and gouging of the shaft. What starts out as a simple failure mode of a corroded threaded assembly can lead to a major failure of one of the main pump components.

### **SOLUTION:**

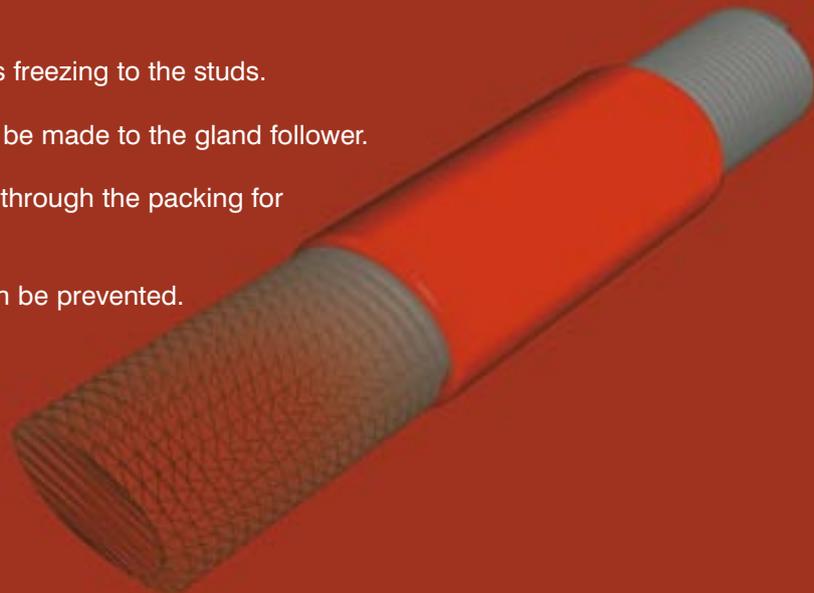
- **Apply Loctite<sup>®</sup> Heavy Duty Anti-Seize\* to the studs.**
- Loctite Heavy Duty Anti-Seize is metal-free and is designed to have superior water wash-out resistance, a key feature in gland application.

### **STEPS:**

1. Clean the parts.
2. Apply Loctite Heavy Duty Anti-Seize to the studs.
3. Assemble gland nuts and adjust gland follower as necessary.

### **RESULTS:**

- Elimination of gland nuts freezing to the studs.
- Proper adjustments can be made to the gland follower.
- Water can properly flow through the packing for lubrication and cooling.
- Excessive shaft wear can be prevented.

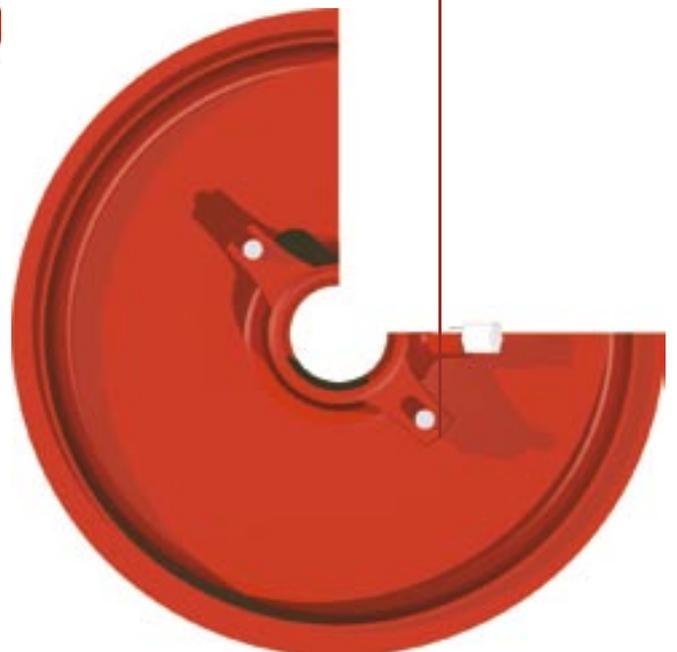


\* See product table on page 59 for a list of alternative Loctite<sup>®</sup> solutions.



Step #2. Apply Loctite 262 High Strength Threadlocker

**CHALLENGE:  
PREVENT SEIZURE AND LOOSENING  
of Gland Studs**



### CAUSE:

- Just as the gland nuts can rust and seize to the gland studs, so can the gland studs rust and seize to the stuffing box. If the nuts were to seize to the studs, the torque required to remove them could cause the studs to back out.

### SOLUTION:

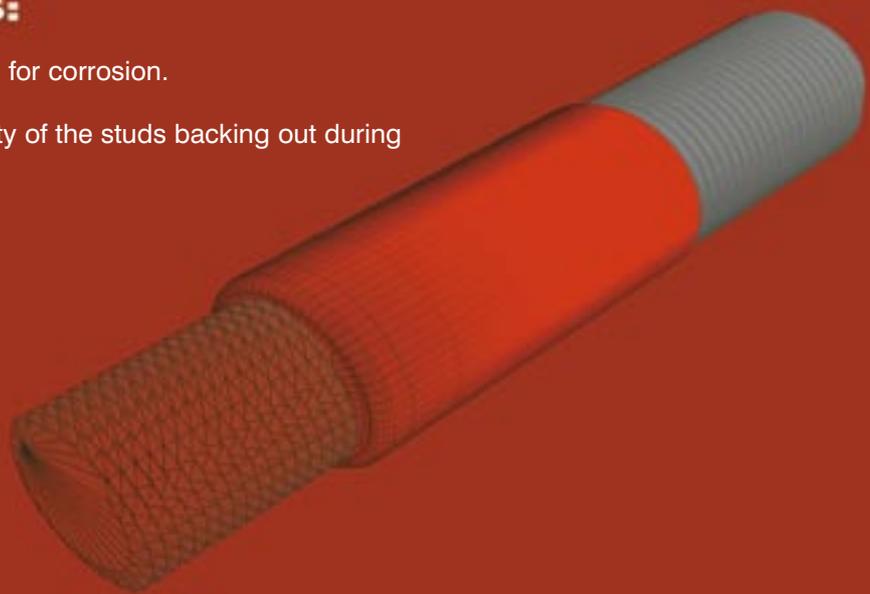
- Apply Loctite® 262 High Strength Threadlocker\*.

### STEPS:

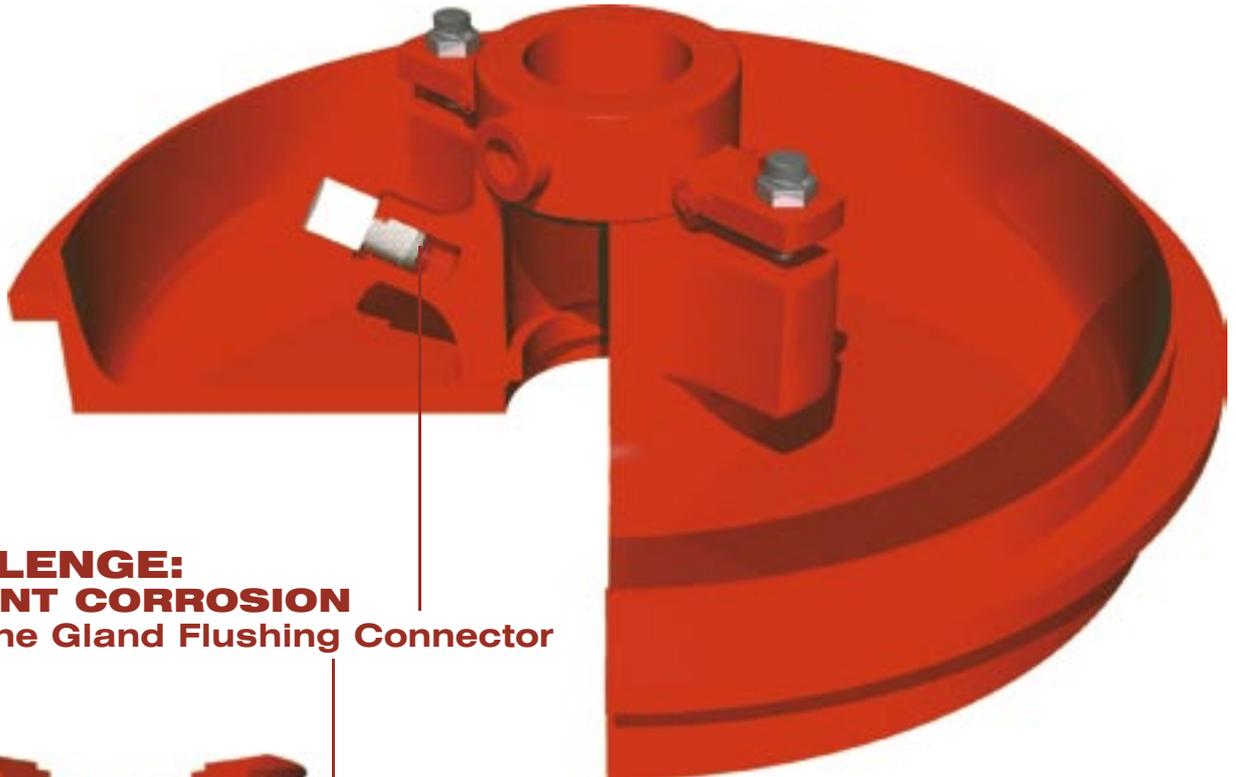
1. Place several drops of Loctite 262 High Strength Threadlocker down the side of the female threads.
2. Apply several drops of Loctite 262 High Strength Threadlocker onto the stud threads.
3. Install the studs.

### RESULTS:

- Eliminated potential for corrosion.
- Eliminated possibility of the studs backing out during gland adjustments.



\* See product table on page 59 for a list of alternative Loctite® solutions.



**CHALLENGE:**  
**PREVENT CORROSION**  
within the Gland Flushing Connector



**CAUSE:**

- Whether using a mechanical seal or packing, these components are typically cooled and lubricated by either a product flush or an external flush. In either case, the flushing connector is prone to corrosion and seizure. This is especially true for pumps configured with packing. Since packing typically requires 40-60 drops per minute for proper cooling and lubrication, there is plenty of available moisture for rust to attack the gland assembly components.

### **SOLUTION:**

- **Apply Loctite® 567 PST® Thread Sealant with PTFE\*.**
- Loctite 567 PST Thread Sealant with PTFE fills the air space within the threads.
- Allows the flushing connector to be removed with normal hand tools when necessary.

### **STEPS:**

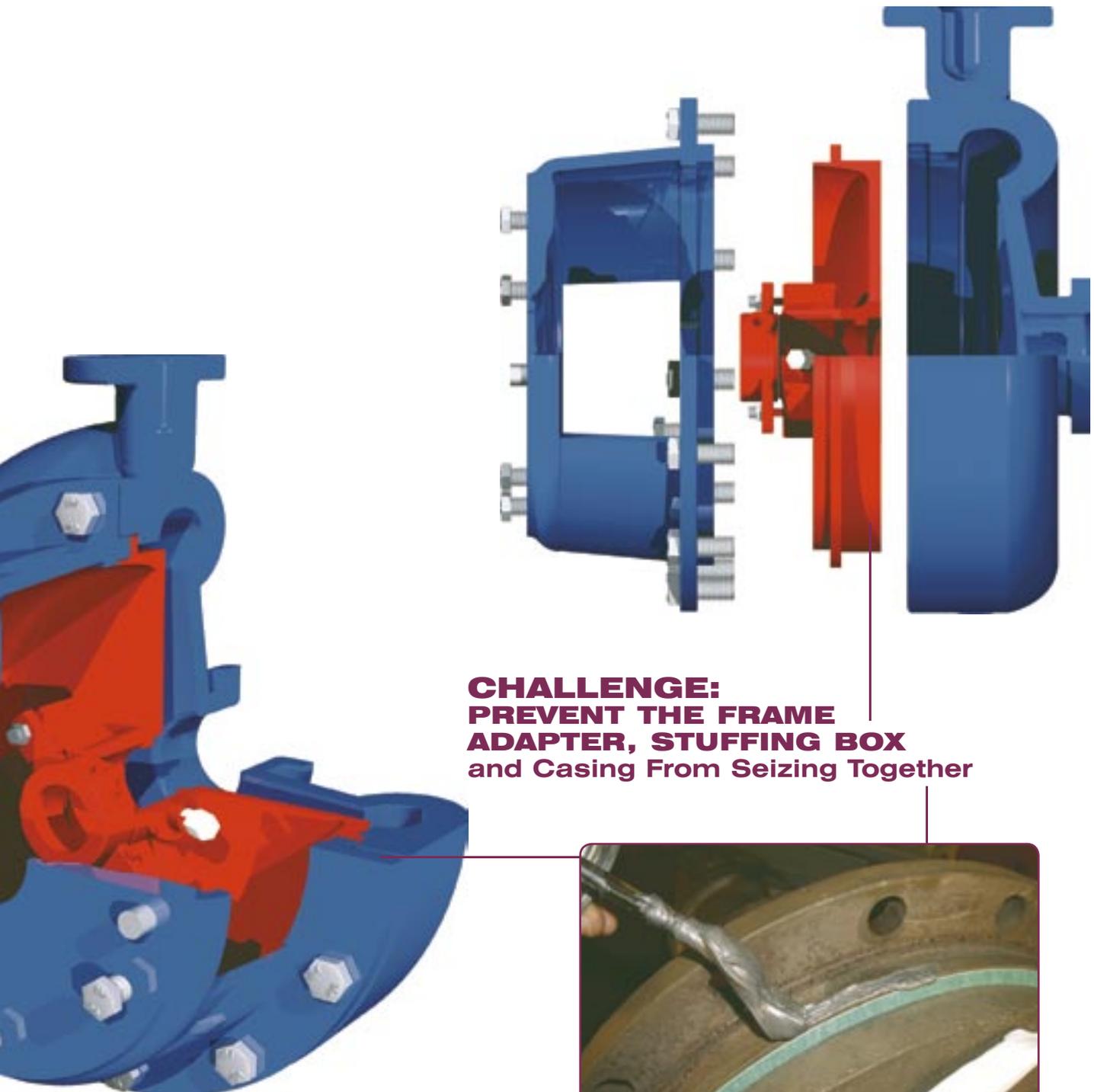
1. Clean the parts with Loctite® ODC-Free Cleaner & Degreaser.
2. Apply a band of Loctite 567 PST Thread Sealant with PTFE to male threads starting one to two threads from the end of the fitting.
3. Assemble parts snugly. Do not overtighten.

### **RESULTS:**

- Prevention of leaks and corrosion.
- Eliminated seizure.
- Ensured easy maintenance of flushing connectors.



\* See product table on page 59 for a list of alternative Loctite® solutions.



**CHALLENGE:**  
**PREVENT THE FRAME**  
**ADAPTER, STUFFING BOX**  
**and Casing From Seizing Together**



Step #2. Apply Loctite Heavy Duty Anti-Seize.

### CAUSE:

- When assembling the frame adapter, stuffing box and casing, there are areas where the clearance is very tight. These small clearances are areas where rust and corrosion can work in to seize the components together, making disassembly very difficult.

### SOLUTION:

- Apply a Loctite® Anti-Seize compound during assembly. Because Loctite Anti-Seize compounds have superior water washout resistance, they will stay where they are applied.

### STEPS:

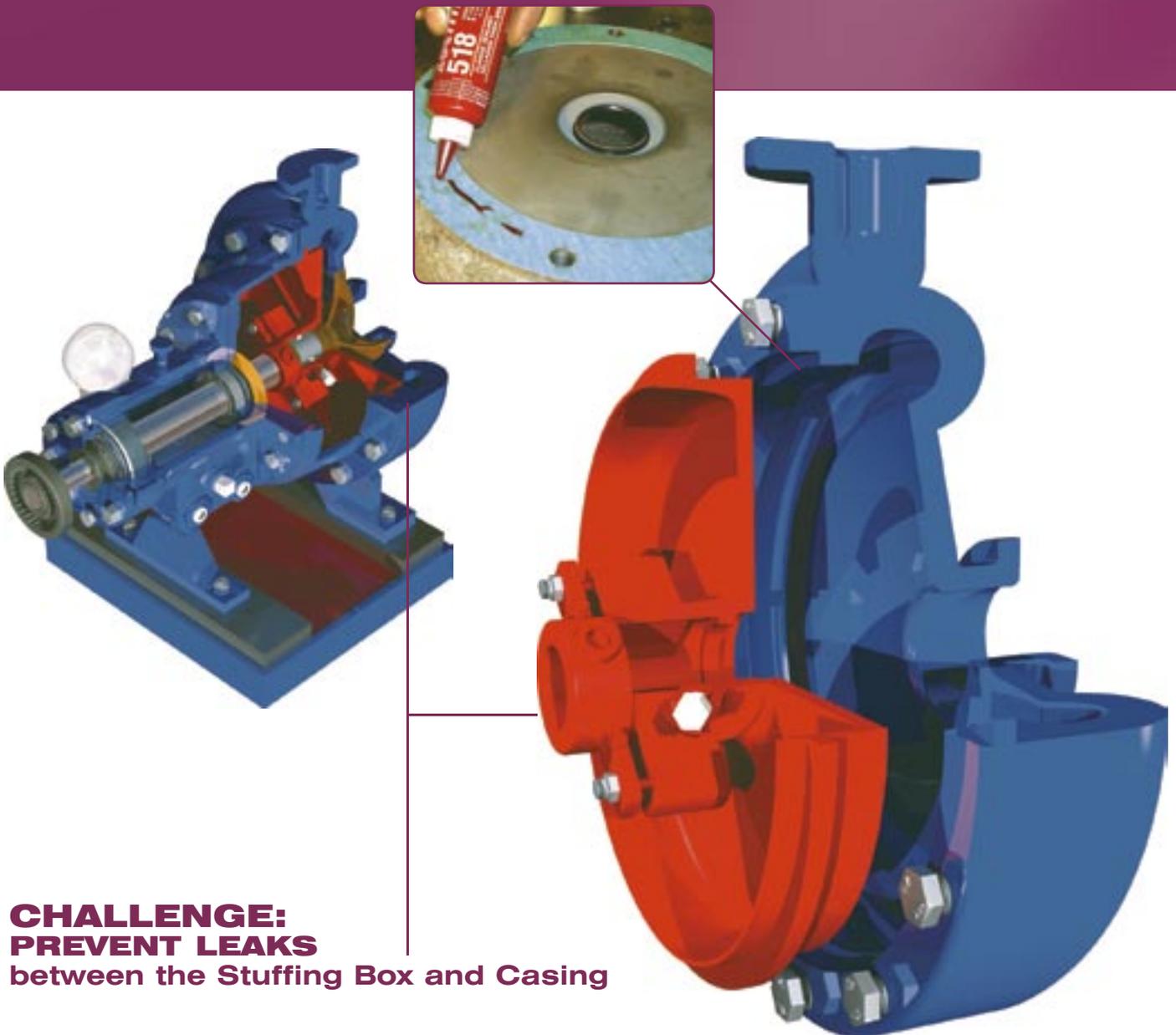
1. Clean the parts.
2. Apply Loctite® Heavy Duty Anti-Seize\* to the outside diameter of the stuffing box at the mating point.
3. Assemble components as usual.

### RESULTS:

- Sufficient lubrication provided during assembly.
- Prevention of rust while in service.
- Efficient disassembly.



\* See product table on page 59 for a list of alternative Loctite® solutions.



**CHALLENGE:  
PREVENT LEAKS**  
between the Stuffing Box and Casing

**CAUSE:**

- The use of cut gaskets suffers from inherent problems, such as gasket relaxation, shrinkage, extrusion, and breakage, which can lead to leaks.

**SOLUTION N° 1:**

- **Replace the cut gasket and apply Loctite 518 Master Gasket Flange Sealant\* to the flange surface.**
- Direct metal-to-metal contact along with the use of Loctite 518 Master Gasket Flange Sealant allows for a positive seal.
- Since there is metal-to-metal contact, proper clamp load can be maintained and the two parts become unitized – they act as one.

### STEPS:

1. Remove old gasketing material with Loctite<sup>®</sup> Chisel<sup>®</sup> Gasket Remover.
2. Clean both flanges with Loctite ODC-Free Cleaner & Degreaser.
3. Spray Loctite 7649 Primer N on only one surface and allow 1-2 minutes to dry.
4. Apply a continuous bead of Loctite 518 Master Gasket Flange Sealant to the other surface.

**Note:** Circle all bolt holes, if appropriate.

5. Assembly and tighten as required.
6. Allow to cure.

### SOLUTION N°2:

- Coat the gasket material with Loctite<sup>®</sup> 518 Master Gasket Flange Sealant or 534 Hi-Tack Gasket Stick\*.
- If there is not enough clearance between the impeller and the casing to eliminate the gasket, the cut gasket must be used.
- Loctite 518 Master Gasket Flange Sealant or 534 Hi-Tack Gasket Dressing Stick will fill all the air space that cut gaskets simply cannot fill.
- Loctite 518 Master Gasket Flange Sealant or 534 Hi-Tack Gasket Dressing Stick will withstand expansion and contraction caused by pressure and temperature changes.

### STEPS:

1. Remove old gasketing material with Loctite Chisel<sup>®</sup> Gasket Remover.
2. Clean both flanges with Loctite ODC-Free Cleaner & Degreaser.
3. Spray Loctite 7649 Primer N to both flange faces and both sides of the gasket. Allow 1-2 minutes to dry.
4. Smear Loctite 518 Master Gasket Flange Sealant or 534 Hi-Tack Gasket Dressing Stick to both sides of the pre-cut gasket.
5. Assembly and tighten as required.
6. Allow to cure.

### RESULTS:

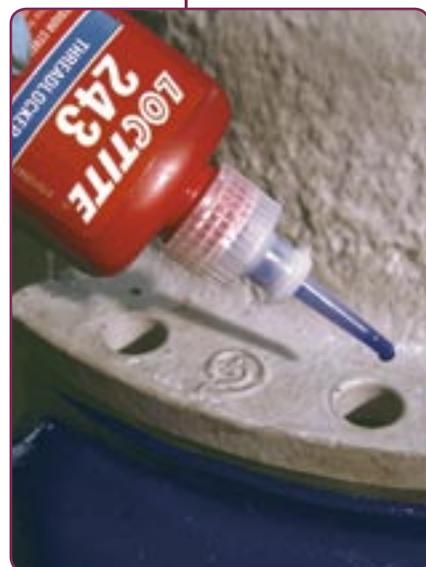
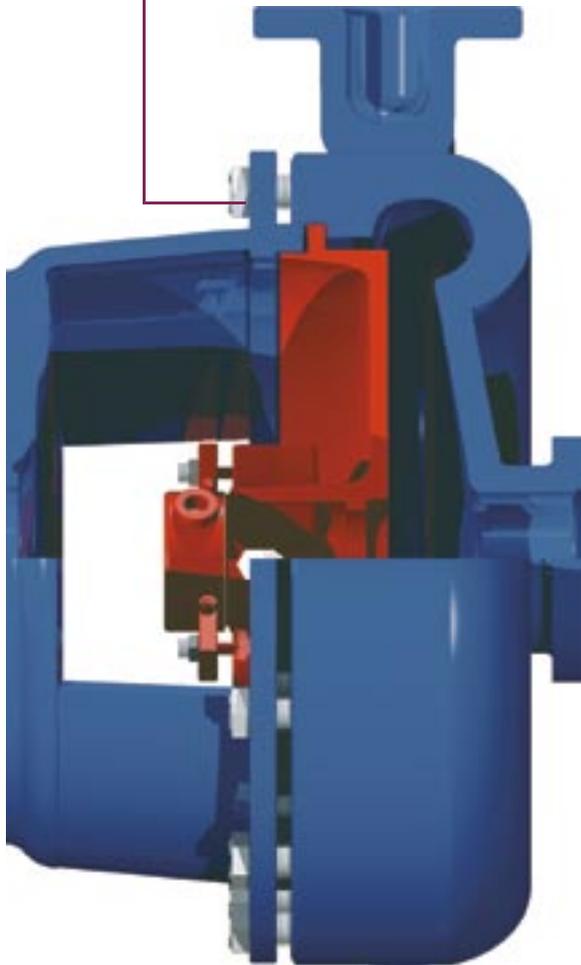
- Eliminated casing gasket leaks.
- Eliminated corrosion and damage on the flange surface.



\* See product table on page 59 for a list of alternative Loctite<sup>®</sup> solutions.



**CHALLENGE:**  
**PREVENT CORROSION**  
and Seizure of the Pump Casing Bolts



Step #1. Apply Loctite 243 Medium Strength Threadlocker

### CAUSE:

- The severe pump environments of constant temperature, pressure, and humidity changes result in corrosion.
- Casing bolts that are rusted and seized make pump maintenance difficult and create additional labor associated with drilling and tapping the bolt hole.

### SOLUTION:

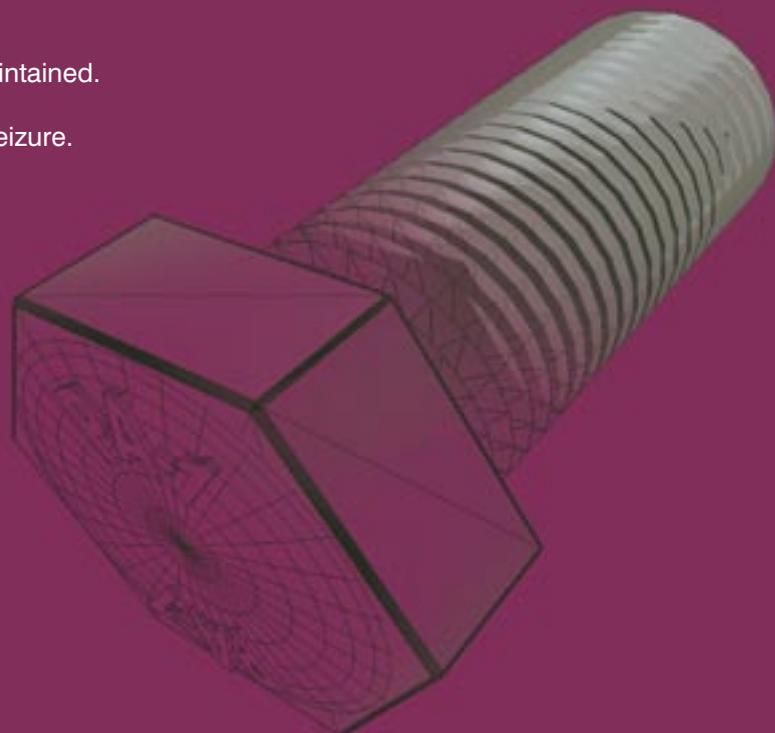
- **Apply Loctite® 243 Medium Strength Threadlocker\* in the bolt holes prior to assembling the casing.**
- Loctite® 243 Medium Strength Threadlocker fills all the air space within the threads.

### STEPS:

1. Place several drops of Loctite 243 Medium Strength Threadlocker down the side of the female threads.
2. Apply several drops of Loctite 243 Medium Strength Threadlocker onto the bolt threads.
3. Install bolts.

### RESULTS:

- Proper clamp load is maintained.
- Elimination of rust and seizure.
- Easy disassembly with normal hand tools.



\* See product table on page 59 for a list of alternative Loctite® solutions.



**CHALLENGE:**  
**PREVENT SEIZURE**  
of the Impeller to the Shaft



Step #2. Apply Loctite Heavy Duty Anti-Seize

### CAUSE:

- The combination of small air spaces within the threads and high humidity and temperatures allows for rust to develop and seize the impeller to the shaft.

### SOLUTION:

- Apply Loctite® Heavy Duty Anti-Seize\* compound to the shaft threads prior to impeller assembly.

### STEPS:

1. Clean the shaft and impeller threads.
2. Apply Loctite Heavy Duty Anti-Seize\* to the shaft threads.
3. Assemble the impeller using normal techniques.

### RESULTS:

- Prevention of seizure.
- Easier disassembly.

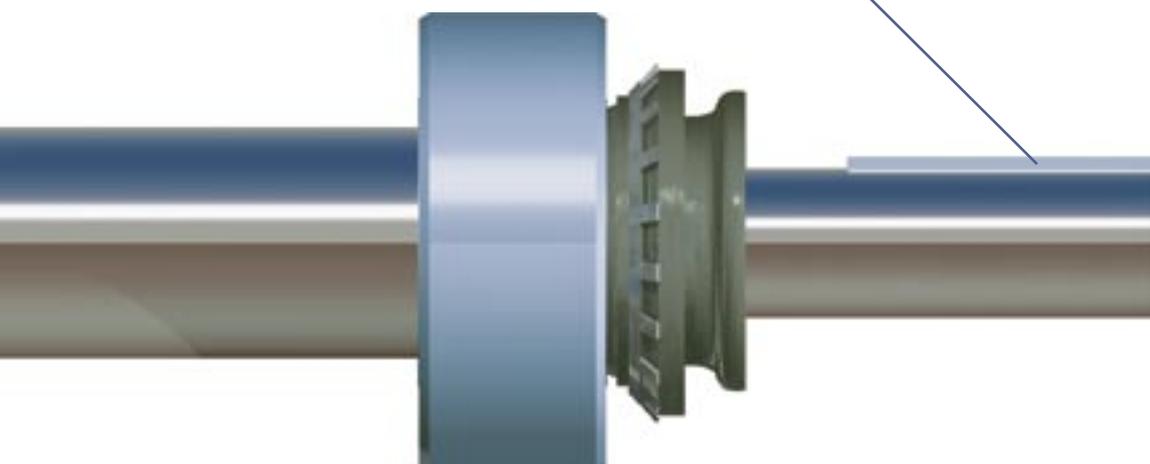


\* See product table on page 59 for a list of alternative Loctite® solutions.



Step #2. Apply Loctite Medium Strength Threadlocker

**CHALLENGE:**  
**PREVENT KEYWAY WALLOW**  
by Securing the Key Stock in the  
Keyway - New Components



**CAUSE:**

- In a new assembly the fit between the key stock and the keyway are usually fairly tight. Over time the fit between the key stock and the keyway can loosen and lead to damage to the keyway.

### **SOLUTION:**

- Proactively apply a Loctite® Medium Strength Threadlocker to the keyway and then insert the key stock.
- The viscosity of a Loctite Medium Strength Threadlocker is appropriate for the gap fill and provides the proper amount of strength, while allowing for easy removal.
- If the key needs to be removed, simply use a hammer to tap a metal chisel or drift against the key stock to pop it out of the keyway.

### **STEPS:**

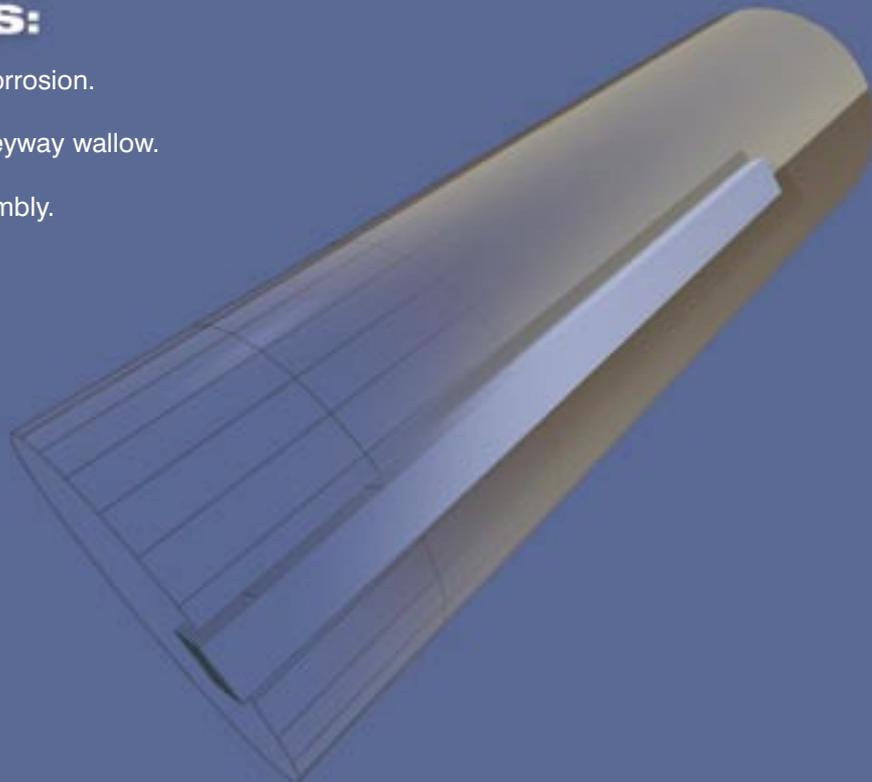
1. Clean the keyway and key stock with Loctite® ODC-Free Cleaner & Degreaser.
2. Apply several drops of Loctite Medium Strength Threadlocker\* directly into the keyway.
3. Insert the key stock into the keyway.

**Note:** Cover the shaft with a rag to prevent splatter when inserting the key stock.

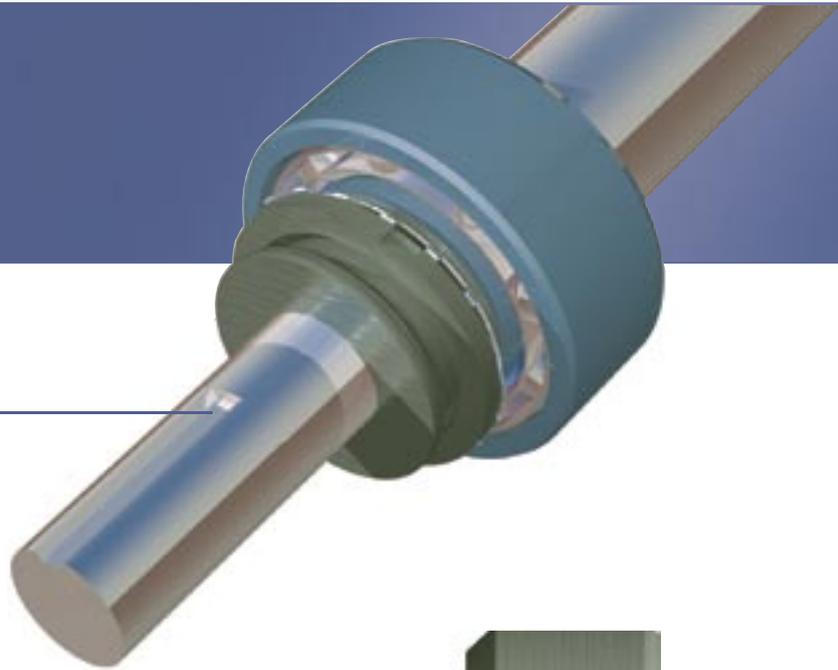
4. Wipe off any excess threadlocker.

### **RESULTS:**

- Prevention of corrosion.
- Prevention of keyway wallow.
- A unitized assembly.



\* See product table on page 60 for a list of alternative Loctite® solutions.



**CHALLENGE:**  
**STOP KEYWAY WALLOW**  
and Prevent Downtime and  
Scrap Costs - Worn Components



**CAUSE:**

- Over time, keyways can wear out if the key stock is not secured in place, which results in keyway wallow. This is a common failure for power transmission components such as couplings, sprockets, sheaves, etc.
- If keyway wallow is allowed to perpetuate, further damage can result, such as a sheared key stock or damage to the coupling. If the key stock shears, the result is a loss of power transmission (i.e. the pump will stop running) and further damage to the shaft will occur.

### **SOLUTION:**

- If the keyway has already been wallowed out, use Loctite<sup>®</sup> 660 Quick Metal<sup>®</sup> Retaining Compound to stop the wallow and allow the components to return to service.
- Loctite 660 Quick Metal Retaining Compound is a very thick product, which allows it to fill large gaps.

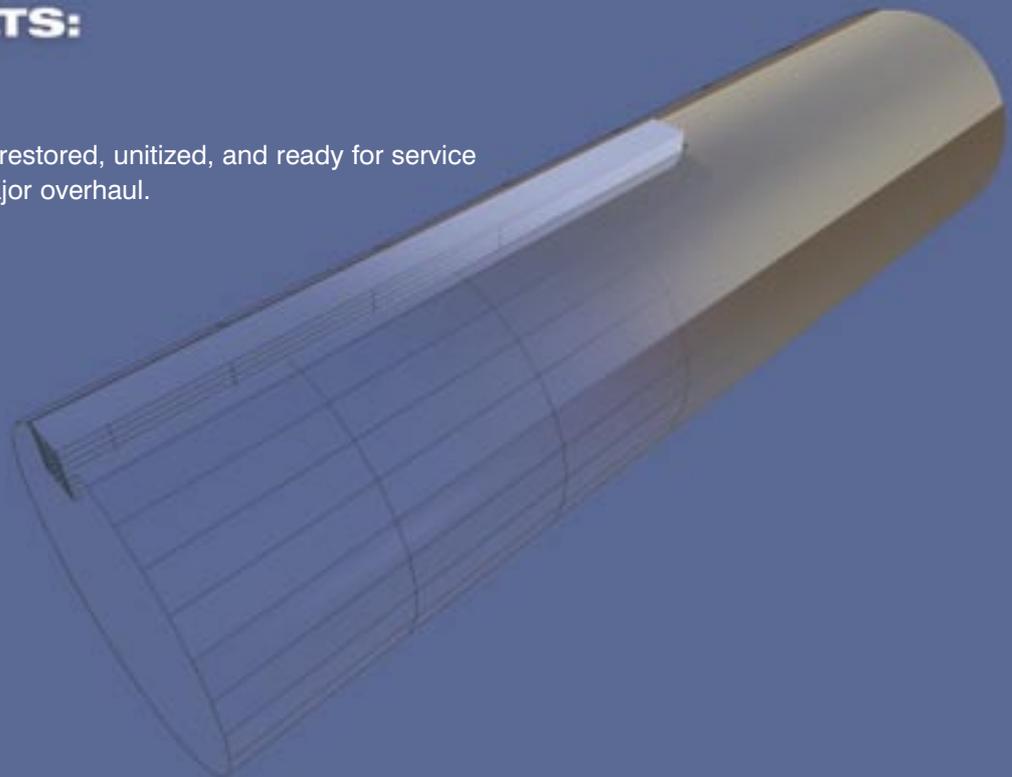
### **STEPS:**

1. Clean the keyway and key stock with Loctite<sup>®</sup> ODC-Free Cleaner & Degreaser.
2. Apply Loctite 660 Quick Metal Retaining Compound into the keyway.
3. Assemble parts and wipe off excess.

**Note:** If keyway wallow is severe, shims can be used on both sides of the keyways in conjunction with the Loctite 660 Quick Metal Retaining Compound.

### **RESULTS:**

- Assembly is restored, unitized, and ready for service without a major overhaul.





Step #3. Apply Loctite 222 Low Strength Threadlocker.

**CHALLENGE:**  
**PREVENT COUPLING FROM LOOSENING**  
or Moving, Resulting in Disengagement,  
Damage, or Misalignment

**CAUSE:**

- Couplings are held in place by a key and a set screw.
- If the set screw was to loosen, the coupling can begin to slide along the shaft and disengage, or it can begin to wallow out the keyway.

### **SOLUTION:**

- Apply Loctite<sup>®</sup> Medium and Low Strength Threadlockers to set screw\*.

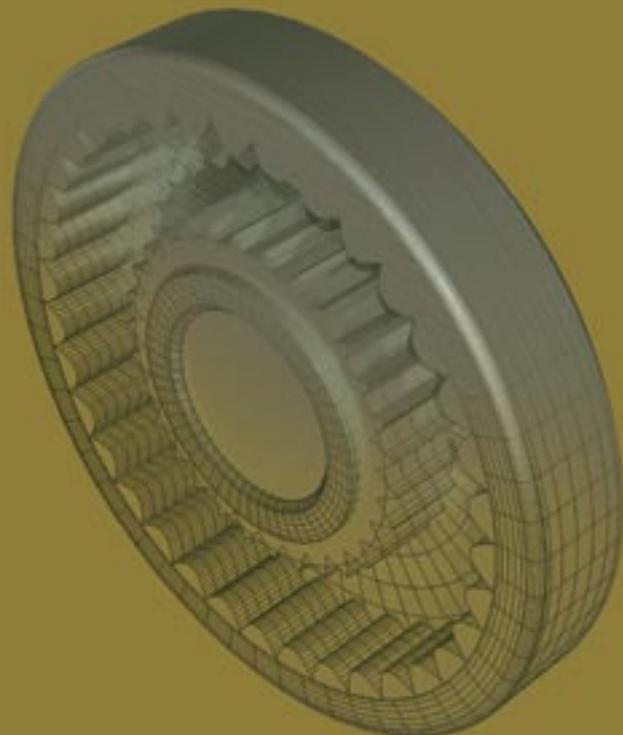
### **CAUSE:**

1. Clean set screw with Loctite<sup>®</sup> ODC-Free Cleaner & Degreaser.
2. If necessary, spray all threads with Loctite<sup>®</sup> 7649 Primer N and allow to dry.
3. Apply a couple of drops of a Loctite<sup>®</sup> 222 Low Strength Threadlocker to the set screw (use a Loctite 243 Medium Strength Threadlocker if the set screw is over 1/4" in diameter).
4. Assemble in the coupling as usual.

**Note:** Consider applying a Loctite Retaining Compound or Threadlocker to the shaft prior to assembling the coupling to completely unitize the coupling to the shaft and prevent any possible corrosion.

### **RESULTS:**

- Assembly is restored, unitized, and ready for service without a major overhaul.



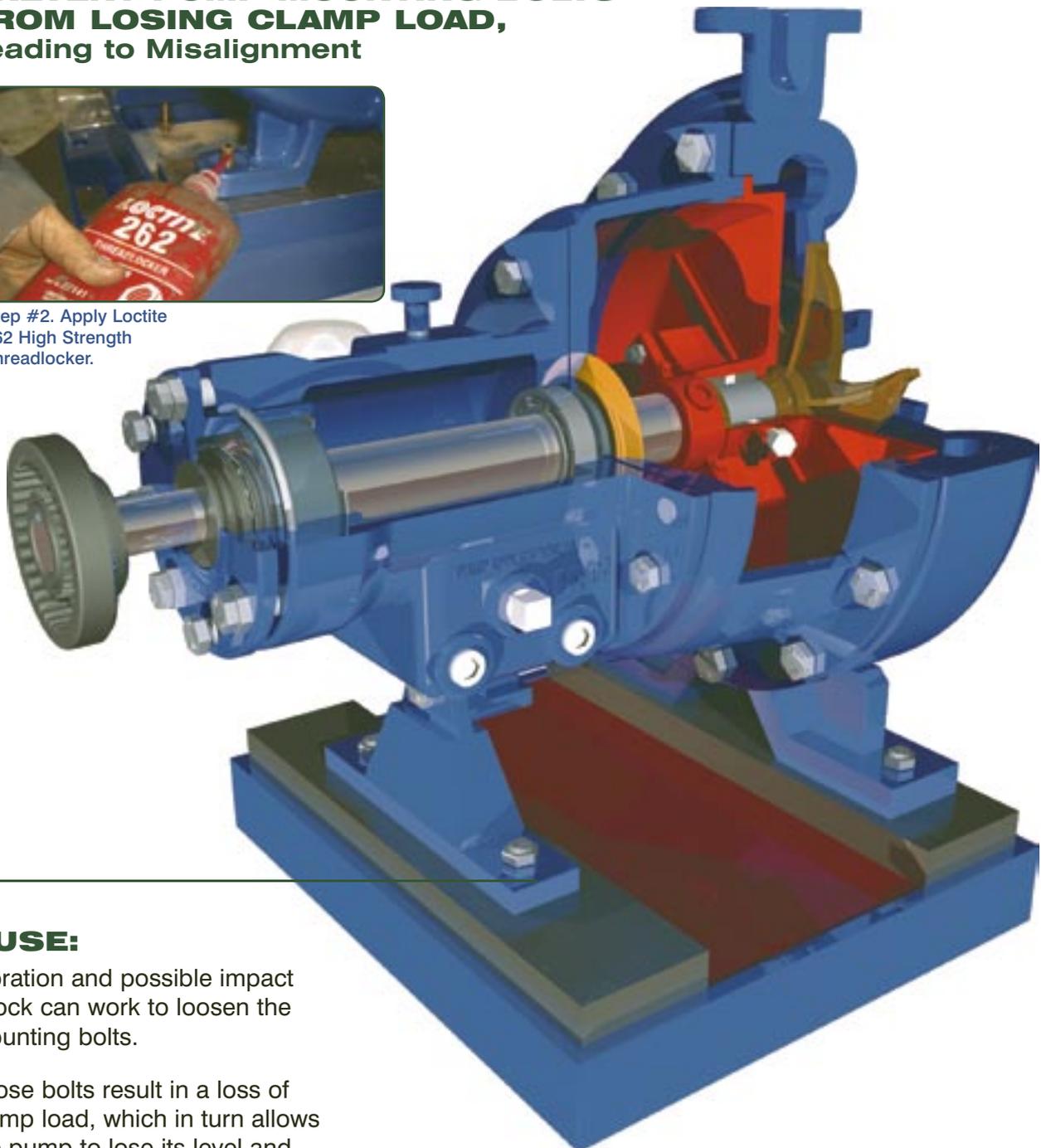
\* See product table on page 60 for a list of alternative Loctite<sup>®</sup> solutions.



**CHALLENGE:**  
**PREVENT PUMP MOUNTING BOLTS**  
**FROM LOSING CLAMP LOAD,**  
Leading to Misalignment



Step #2. Apply Loctite  
262 High Strength  
Threadlocker.



**CAUSE:**

- Vibration and possible impact shock can work to loosen the mounting bolts.
- Loose bolts result in a loss of clamp load, which in turn allows the pump to lose its level and aligned configuration.

### **SOLUTION N°1**

- Apply Loctite® 262 High Strength Threadlocker\* to the mounting bolts.

#### **STEPS:**

1. Clean threads with Loctite® ODC-Free Cleaner & Degreaser.
2. Apply several drops of Loctite 262 High Strength Threadlocker\* to the mounting bolts.
3. Assemble and tighten as usual.

### **SOLUTION N°2**

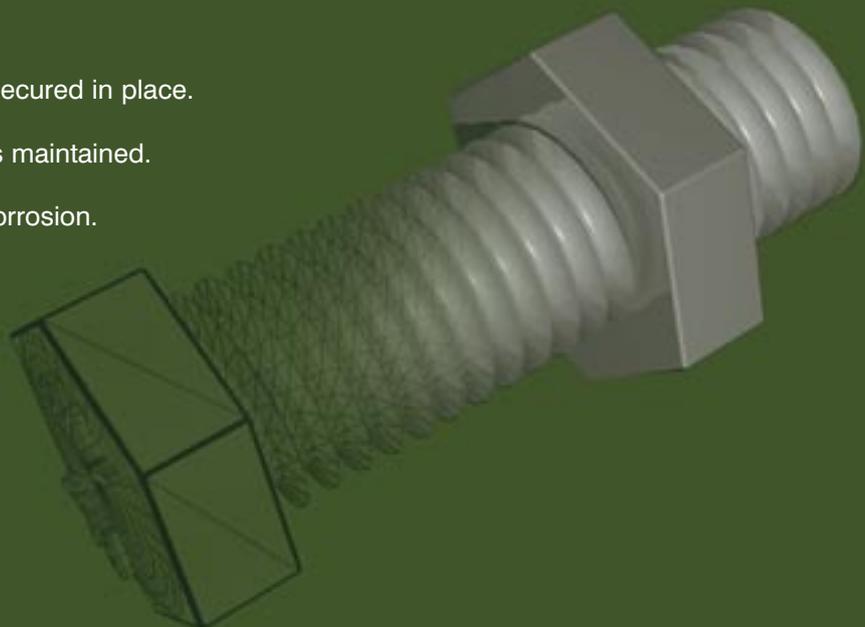
- Apply Loctite® 290 Wicking Grade Threadlocker to the mounting bolts after the pump has been leveled and aligned.

#### **STEPS:**

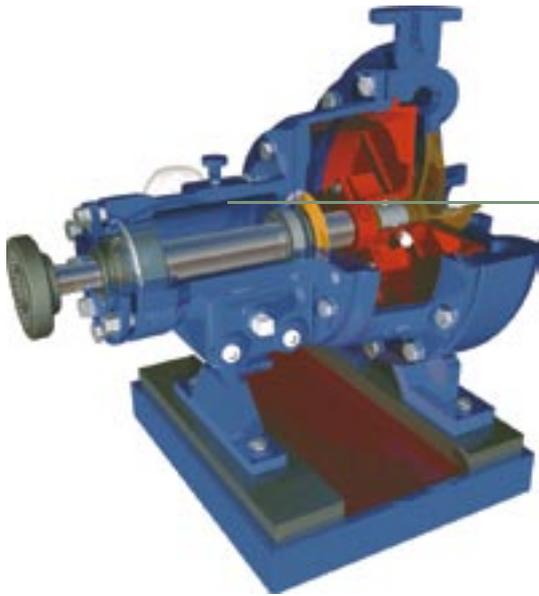
1. Clean the parts with Loctite® ODC-Free Cleaner & Degreaser.
2. Align the pump.
3. Tighten the nuts on the mounting studs.
4. Apply several drops of Loctite 290 Wicking Grade Threadlocker\* to the mounting bolts.

### **RESULTS:**

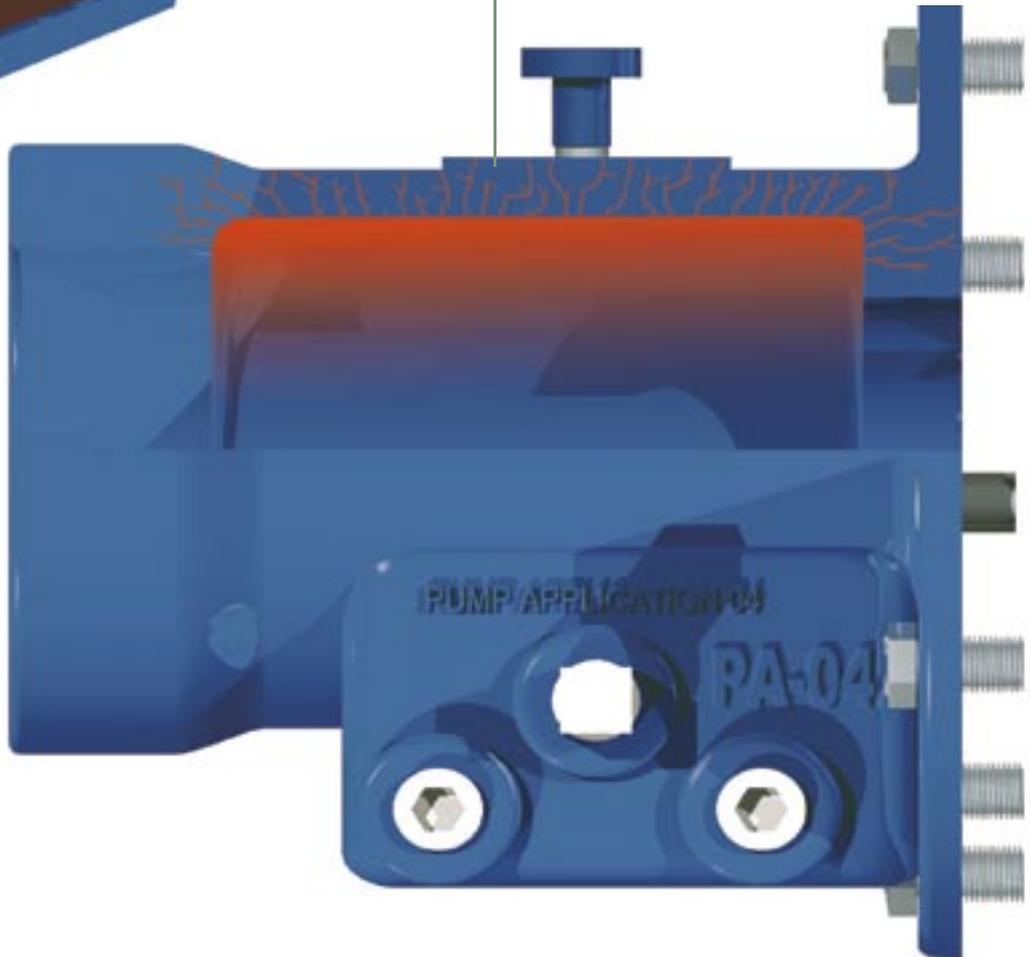
- Mounting bolts are secured in place.
- Proper clamp load is maintained.
- Elimination of bolt corrosion.
- Prevention of misalignment.



\* See product table on page 60 for a list of alternative Loctite® solutions.



**CHALLENGE:**  
PREVENT OIL LOSS  
from Seepage



**CAUSE:**

- This cast part can have porosities created during the casting. These porosities can lead to the housing weeping oil.

### **SOLUTION N°1:**

- Coat interior of bearing frame to seal porosities with Loctite® Nordbak® Chemical Resistant Coating.

### **STEPS:**

1. Blast the interior of the bearing frame to remove contaminants.
2. Apply Loctite Nordbak Chemical Resistant Coating to the interior of the bearing housing to protect and coat the bearing frame.

### **SOLUTION N°2:**

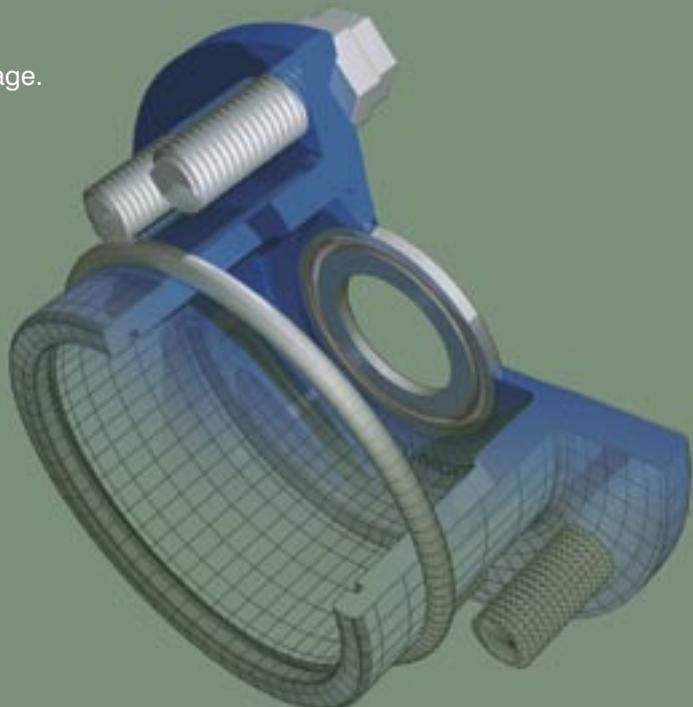
- For a part where the specific leak points are known, brush on Loctite® 290 Super Wick-In Threadlocker.

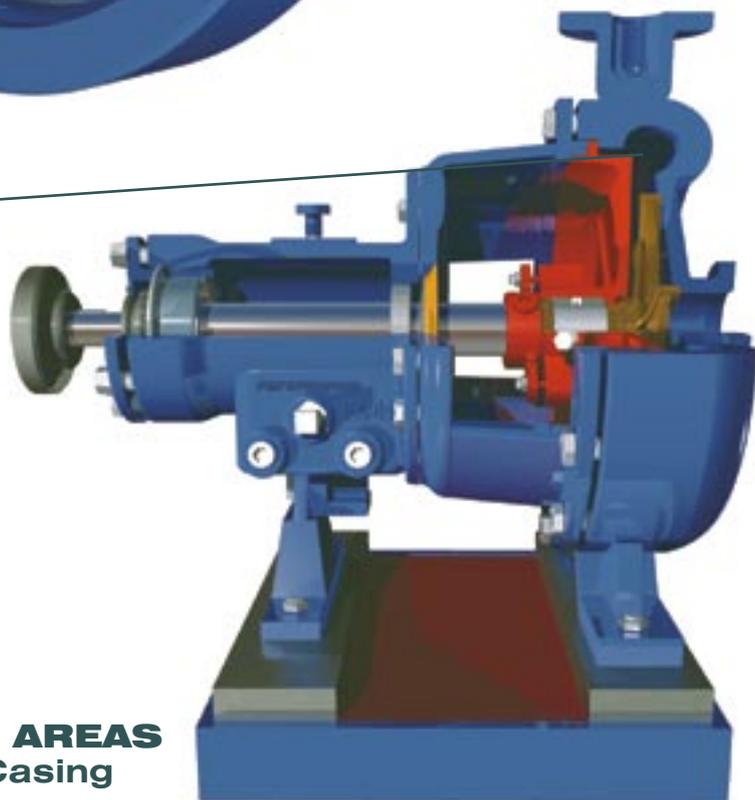
### **STEPS:**

1. Clean the surface.
2. Bake it dry.
3. Brush on Loctite® 290 Super Wick-In Threadlocker.
4. Allow to cure.

### **RESULTS:**

- Elimination of oil loss through seepage.
- Reduced oil consumption.
- Reduced clean up.





**CHALLENGE:**  
**REBUILD WORN AREAS**  
to Restore Pump Casing  
and Impellers

### CAUSE:

- Pump casings and impellers are subject to wear from abrasive slurries and solids, cavitation, and chemical attack. Each of these can wear down internal sections of pump casing.
- Some of the common wear areas include the cutwater, wear ring seats, impeller vane tips, and inside the volute.
- Casing and impeller wear typically falls within the following four category types:
  1. Minor abrasive wear from pumping light slurries.
  2. Heavy casing wear and erosion from pumping solids and/or cavitation.
  3. Chemical attack.
  4. Wear to specific areas of the casing or impeller.

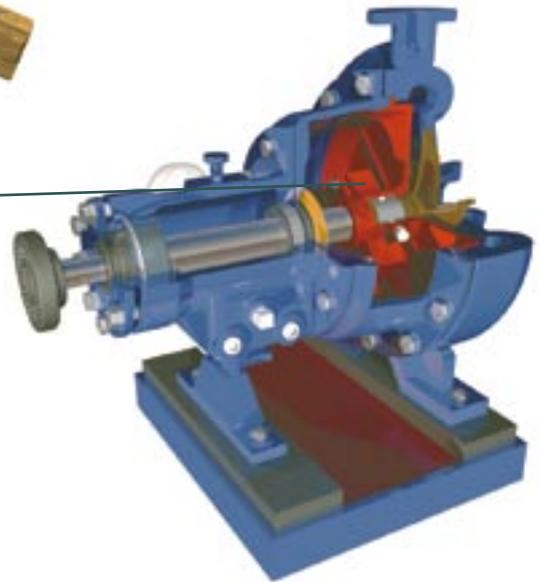
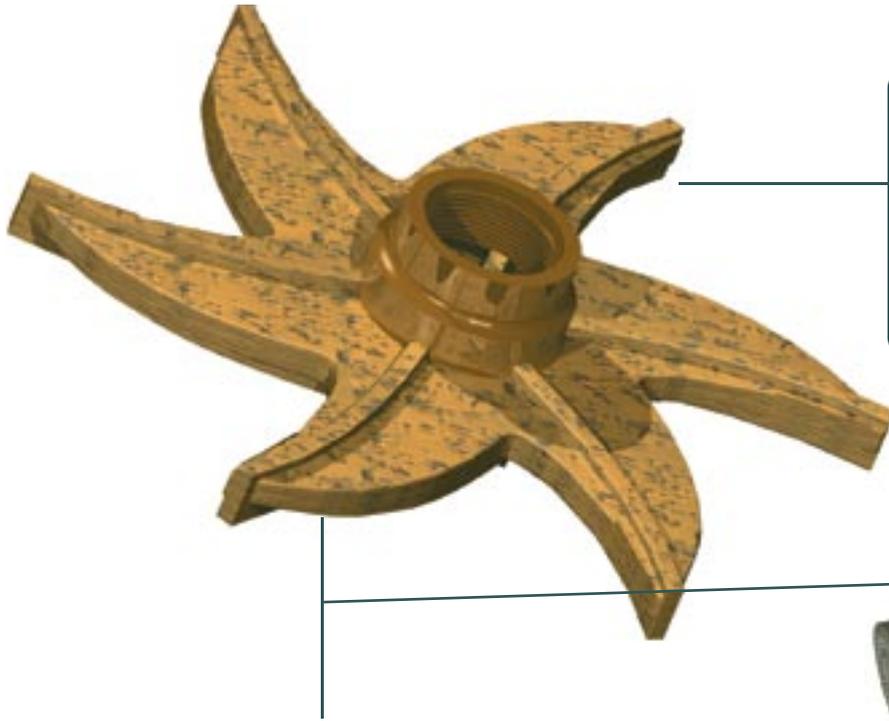
### SOLUTION N° 1:

- **Repair minor surface wear. Rebuild and coat the surface with Loctite® Nordbak® Brushable Ceramic\*.**
- Provides a high gloss, low friction finish to help ensure the pump runs as close to its BEP [Best Efficiency Point] as possible.

### STEPS:

1. Clean and abrade the surface to a near white metal finish.
2. Mix and apply Loctite Nordbak Brushable Ceramic as per the package instruction.
3. Apply a coat of white Brushable Ceramic first, and then a second coat of grey Brushable Ceramic, to allow for easy visual inspection of the coating and wear.
4. Use as many coats as necessary to restore the casing to original dimensions.

\* See product table on page 60 for a list of alternative Loctite® solutions.



**CHALLENGE:  
REBUILD WORN AREAS  
to Restore Pump Casing  
and Impellers**



**SOLUTION N°2:**

- Repair heavy surface wear to the casing.  
Rebuild the casing with Loctite® Nordbak® Wearing Compound.
- Ceramic beads provide superior wear resistance.

**STEPS:**

1. Clean and abrade the surface to a near white metal finish.
2. Mix and apply Loctite Nordbak Wearing Compound as per the package instructions.
3. Use isopropyl alcohol to smooth the finish.
4. Apply a topcoat of Loctite Nordbak® Brushable Ceramic to provide a low-friction finish.

### **SOLUTION N°3:**

- Repair damage from chemical attack and provide a protective coating. Coat the casing and the impeller with Loctite® Nordbak® Chemical Resistant Coating\*.
- Protects parts in severe chemical environments.

### **STEPS:**

1. Clean and abrade the surface to a near white metal finish.
2. Mix and apply Loctite® Nordbak Chemical Resistant Coating as per the package instructions.

### **SOLUTION N°4:**

- Rebuild worn areas of the casing and impeller. Apply Loctite Fixmaster® Superior Metal or Loctite Nordbak Wear Resistant Putty to rebuild worn cutwaters, wear ring seats, impeller vane tips, or other specific areas of the casing.
- Use Loctite Fixmaster Superior Metal to rebuild heavily worn areas.
- Use Loctite Nordbak Wear Resistant Putty in areas where there is constant abrasion, such as wear ring seats.

### **STEPS:**

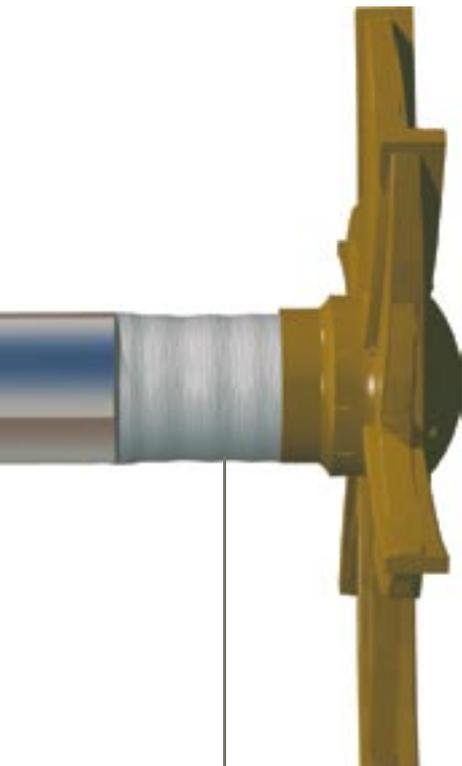
1. Clean and abrade the surface to a near white metal finish.
2. Mix and apply the products as per the package instructions.

### **RESULTS:**

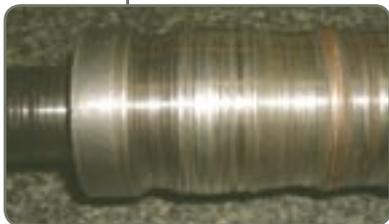
- Reduced component consumption by salvaging and extending the life of pump casings.
- Casings protected from wear and chemical attack.
- Pumps helped to run close to their BEP.



\* See product table on page 60 for a list of alternative Loctite® solutions.



**CHALLENGE:  
RESTORE WORN SHAFT  
to the Original Condition**



Step #4. Apply Loctite Fixmaster Superior Metal



**CAUSE:**

- Wear caused by packing and oil seals is typically the result of constant pressure and abrasion against the shaft surface.
- Over time, oil seals can cut a groove in a shaft.
- Neglect and improper water lubrication can cause the packing to heat up and in turn, cause severe wear to the shaft.

### **SOLUTION:**

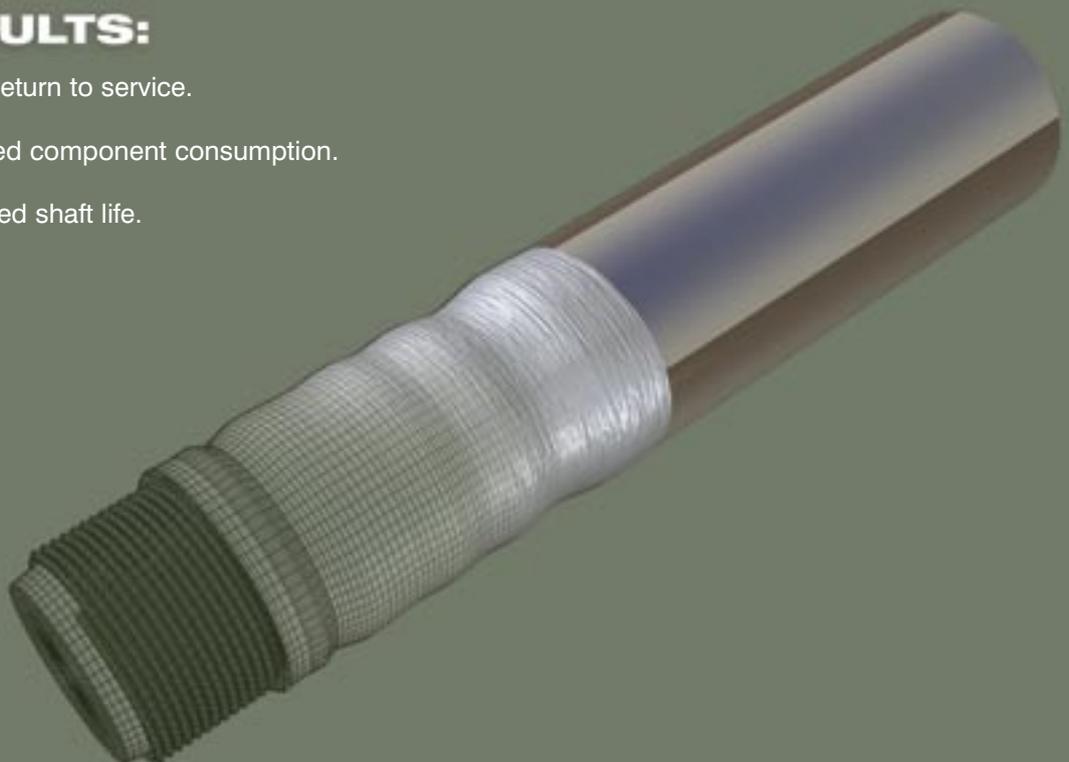
- Rebuild shafts with Loctite® Fixmaster® Superior Metal\*.
- Loctite Fixmaster® Superior Metal is an epoxy with high compressive strength that will not rust.

### **STEPS:**

1. To make the repairs, turn the shaft on a lathe and even out the worn areas to at least 0.030", leaving a rough surface finish.
2. Clean the shaft of any cutting fluids or oils with Loctite® ODC-Free Cleaner & Degreaser.
3. Mix the product as per the package instructions.
4. While the shaft is turning on the lathe, apply Loctite Fixmaster Superior Metal\* by pressing it into the shaft. Firm pressure is required to squeeze out any potential air pockets.
5. The cured product can be turned on the lathe and brought down to the original shaft diameter.

### **RESULTS:**

- Quick return to service.
- Reduced component consumption.
- Extended shaft life.



\* See product table on page 60 for a list of alternative Loctite® solutions.



**CHALLENGE:  
REPAIR WALLOUED OUT KEYWAYS**

**CAUSE:**

- Shaft vibration and external forces affect key stability. Over time, this instability leads to keyway walling.

### SOLUTION:

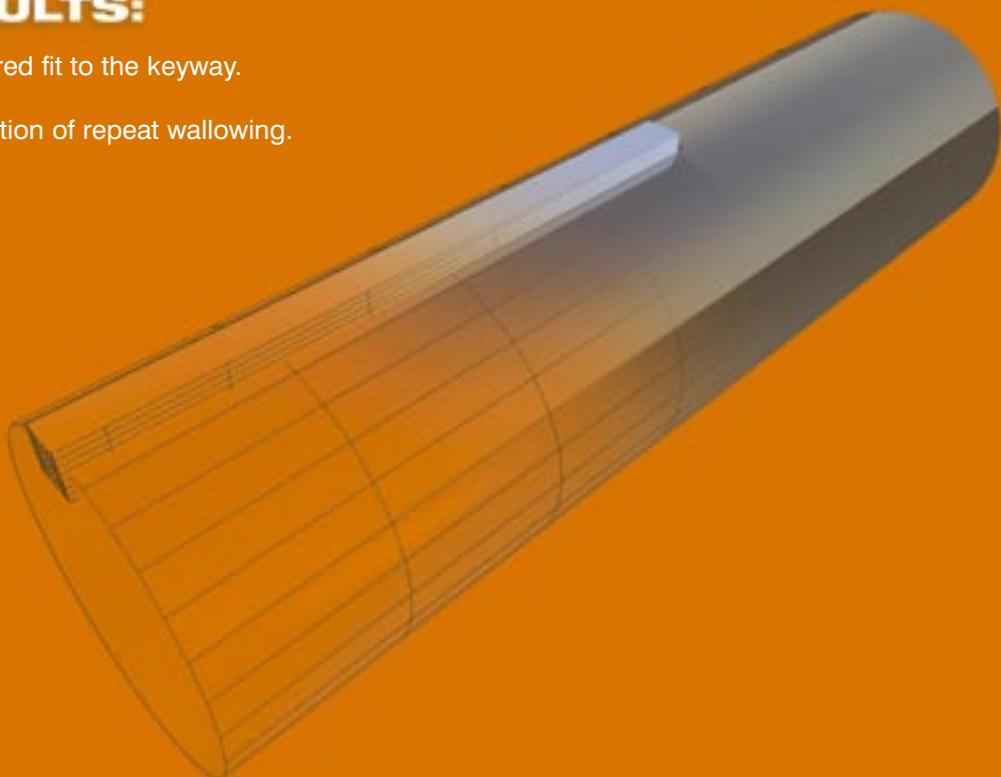
- Apply a bead of Loctite® 660 Quick Metal® Retaining Compound directly in the worn keyway.
- Loctite 660 Quick Metal Retaining Compound is a heavy-bodied product designed to fill large voids, up to 0.030".

### STEPS:

1. If the keyway wallow is severe, you may need to add shims to both sides.
2. Apply Loctite 660 Quick Metal Retaining Compound directly into the keyway.
3. Press the new key stock into the keyway and the assembly is restored without having to take apart the pump.

### RESULTS:

- A secured fit to the keyway.
- Elimination of repeat wallowing.





**CHALLENGE:**  
**PREVENT CORROSION DAMAGE**  
to External Parts



**CAUSE:**

- The external components can suffer from rust and chemical attack due to exposure to the elements, extreme temperatures, temperature changes, humidity, and chemicals.

## section 14.1 PUMP REPAIR

### **SOLUTION:**

- Apply Loctite® Nordbak® Chemical Resistant Coating to external parts.
- Originally developed to protect mining equipment from sulphuric acid.
- Provides an excellent coating to protect pump parts from a variety of severe chemical environments.

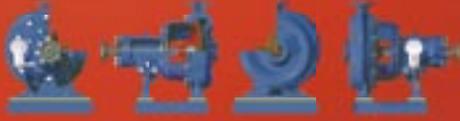
### **STEPS:**

1. Clean and abrade the surface to a near white metal finish.
2. Mix and apply Loctite Nordbak Chemical Resistant Coating as per the package instructions.

### **RESULTS:**

- Extended equipment life.
- Reduced component consumption.
- Increased pump reliability.



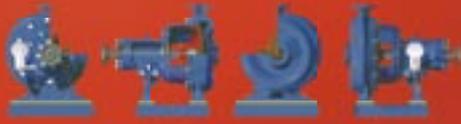


COMPONENTS	SECTION	APPLICATIONS	LOCTITE® SOLUTIONS	BENEFITS	PACKAGE	PART N°	
BEARING FRAME AND HOUSING	2.1	Threaded Fittings	567 PST Thread Sealant with PTFE	High temperature solvent resistant	50ml	56747A	
			561 PST Pipe Sealant Stick with PTFE	Semi-solid, controlled strength	19g	37776	
	2.2	Oil Seals	248 Med. Strength Threadlocker Stick	Semi-solid, medium strength	19g	37773	
			243 Med. Strength Threadlocker	Medium strength, oil resistant	50ml	21321	
	2.3	Power End Bolts	Silver Grade Anti-Seize	General purpose - up to 870°C	500g	76769	
			Silver Grade Anti-Seize Stick	Semi-solid, general purpose	20g	37783	
			C5-A Copper Based Anti-Seize	General purpose - up to 890°C	453g	51007	
			Heavy Duty Anti-Seize	Metal free, high lubricity	510g	51606	
			Food Grade Anti-Seize	NSF Approved to 360°C	226g	51168	
	2.4	Bearings	641 Retaining Compound	Press slip fits, low strength	50ml	21315	
			609 Retaining Compound	Press fit, general purpose	50ml	30015	
			668 Retaining Compound Stick	Semi-solid, slip fit, high temperature	19g	40391	
			620 Retaining Compound	Slip fit, high temperature	50ml	62050	
	FRAME ADAPTER	3.1	Oil Seals	248 Med. Strength Threadlocker Stick	Semi-solid, medium strength	19g	37773
				243 Med. Strength Threadlocker	Medium strength, oil resistant	50ml	21321
		3.2	Dowel Pins	Silver Grade Anti-Seize	General purpose - up to 870°C	50ml	76769
Silver Grade Anti-Seize Stick				Semi-solid, general purpose	20g	37783	
C5-A Copper Based Anti-Seize				General purpose - up to 890°C	453g	51007	
Heavy Duty Anti-Seize				Metal free, high lubricity	510g	51606	
Food Grade Anti-Seize				NSF Approved to 360°C	510g	51168	
3.3		Gasketing	518 Master Gasket Flange Sealant	General purpose, up to 0.5mm	50ml	25583A	
			515 Master Gasket Flange Sealant	General purpose, up to 0.5mm	50ml	51531A	
			548 Gasket Eliminator Flange Sealant Stick	Semi-solid	18g	40393	
			510 Gasket Eliminator	Rigid, high temp.	50ml	25555A	
			Loctite Instant Gasket	Superior bonding to oil contaminated metals	198g	30507	
3.4		Adapter Bolts	243 Med. Strength Threadlocker	Medium strength, oil resistant	50ml	21321	
			248 Med. Strength Threadlocker Stick	Semi-solid, medium strength	19g	37773	
			Heavy Duty Anti-Seize	Metal free, high lubricity	510g	51606	

# PRODUCTS TABLE / INDEX

## section 15.1 PRODUCT INFORMATION

COMPONENTS	SECTION	APPLICATIONS	LOCTITE® SOLUTIONS	BENEFITS	PACKAGE	PART N°
GLAND ASSEMBLY	4.1	Packing Gland Nuts	Silver Grade Anti-Seize	General purpose - up to 870°C	500g	76769
			Silver Grade Anti-Seize Stick	Semi-solid, general purpose	20g	37783
			C5-A Copper Based Anti-Seize Lubricant	General purpose - up to 890°C	453g	51007
			Heavy Duty Anti-Seize	Metal free, high lubricity	510g	51606
			Food Grade Anti-Seize	NSF App. to 360°C	226g	51168
	4.2	Packing Gland Studs	271 Threadlocker	High strength	50ml	27150
			262 High Strength Threadlocker	Med. to high strength	50ml	26250
			268 High Strength Threadlocker Stick	Semi-solid, high strength	19g	37775
			243 Med. Strength Threadlocker	Medium strength, oil resistant	50ml	21321
			248 Med. Strength Threadlocker Stick	Semi-solid, medium strength	19g	37773
	4.3	Flushing Connectors	567 PST Thread Sealant with PTFE	High temperature, solvent resistant	50ml	56747A
			561 PST Pipe Sealant Stick with PTFE	Semi-solid, controlled strength	19g	37776
PUMP CASING	5.1	Stuffing Box	Silver Grade Anti-Seize	General purpose - up to 870°C	500g	76769
			Silver Grade Anti-Seize Stick	Semi-solid, general purpose	20g	37783
			C5-A Copper Based Anti-Seize Lubricant	General purpose, up to 890°C	453g	51007
			Heavy Duty Anti-Seize	Metal free, high lubricity	510g	51606
			Food Grade Anti-Seize	NSF App. to 360°C	226g	51168
	5.2	Gasketing	518 Master Gasket Flange Sealant	Gen. purpose , up to 0.5mm	50ml	25583A
			515 Master Gasket Flange Sealant	General purpose, up to 0.5mm	50ml	51531A
			548 Gasket Eliminator Flange Sealant Stick	Semi-solid	18g	40393
			510 Gasket Eliminator	Rigid, high temp.	50ml	25555A
			534 Hi-Tack Gasket Dressing Stick	Semi-solid	19g	40392
			Loctite Instant Gasket	Superior bonding to oil contaminated metals	198g	30507
	5.3	Casing Bolts	243 Med. Strength Threadlocker	Med. strength, oil res.	50ml	21321
			248 Med. Strength Threadlocker Stick	Semi-solid, medium strength	19g	37773
			Heavy Duty Anti-Seize	Metal free, high lubricity	510g	51606
	IMPELLER	6.1	Shaft and Impeller Threads	Silver Grade Anti-Seize	General purpose - up to 870°C	500g
Silver Grade Anti-Seize Stick				Semi-solid, general purpose	20g	37783
C5-A Copper Based Anti-Seize Lubricant				General purpose, up to 890°C	453g	51007
Heavy Duty Anti-Seize				Metal free, high lubricity	510g	51606
Food Grade Anti-Seize				NSF App. to 360°C	226g	51168



# PUMP SOLUTIONS TABLE

COMPONENTS	SECTION	APPLICATIONS	LOCTITE® SOLUTIONS	BENEFITS	PACKAGE	PART N°
KEYWAYS AND KEY STOCK	7.1	Prevent keyway wallow	243 Med. Strength Threadlocker	Medium strength, oil resistant	50ml	21321
	7.2	Repair keyway wallow	660 Quick Metal® Retaining Compound	Press fit repair	50ml	66040A
COUPLING	8.1	Prevent coupling from loosening	222 Low Strength Threadlocker	Low strength, small screws	50ml	22250
			243 Med. Strength Threadlocker	Medium strength, oil resistant	50ml	21321
			248 Med. Strength Threadlocker Stick	Semi-solid, medium strength	19g	37773
			271 High Strength Threadlocker	High strength	50ml	27150
PUMP BASE MOUNTING	9.1	Mounting bolts	271 High Strength Threadlocker	High strength	50ml	27150
			262 High Strength Threadlocker	Medium to high strength	50ml	26250
			268 Hi Strength Threadlocker Stick	Semi-solid, high strength	19g	37775
			290 Super Wick-In Threadlocker	Wicking for post assembly	50ml	29050
OIL SEEPAGE	10.1	Porosity sealing	Nordbak® Chemical Resistant Coating	Protective coating	5.43kg	96092
			290 Super Wick-In Threadlocker	Wicking for sealing porosity	50ml	29050
CASING AND IMPELLER WEAR	11.1	Wear	Nordbak Brushable Ceramic - Grey	Smooth, corrosion resistant coating	907g	98733
			Nordbak Brushable Ceramic - White	Smooth, corrosion resistant coating	907g	96443
			Nordbak High Temperature Brushable Ceramic	Protection up to 260°	907g	96433
			Nordbak Wearing Compound	Trowelable, large ceramic beads	2.3kg	99813
			Nordbak Chemical Resistant Coating	Protection against chemical attack	5.43kg	96092
			Fixmaster® Superior Metal	Ferro-silicon filled repair epoxy	408g	97473
			Fixmaster Wear Resistant Putty	Ceramic fibre filled epoxy	454g	98742
SHAFT WEAR	12.1	Wear	Fixmaster Superior Metal	Ferro-silicon filled repair epoxy	408g	97473
			Fixmaster Stainless Steel Putty	Stainless steel filled repair epoxy	454g	97443
			Fixmaster Steel Putty	Steel filled repair epoxy	454g	99913
KEYWAY WALLOW	13.1	Wallow	660 Quick Metal® Retaining compound	Press fit repair	50ml	66040A
CORROSION	14.1	Corrosion	Nordbak Chemical Resistant Coating	Protection against chemical attack	5.43kg	96092

## section 15.1 PRODUCT INFORMATION

LOCTITE® SOLUTIONS	BENEFITS	PACKAGE	PART N°
222 Low Strength Threadlocker	Low strength, small screws	50ml	22250
243 Medium Strength Threadlocker	Medium strength, oil resistant	50ml	21321
248 Medium Strength Threadlocker Stick	Semi-solid, medium strength	19g	37773
262 High Strength Threadlocker	Medium to high strength	50ml	26250
268 High Strength Threadlocker Stick	Semi-solid, high strength	19g	37775
271 High Strength Threadlocker	High strength	50ml	27150
290 Super Wick-In Threadlocker	Wicking for post-assembly	50ml	29050
510 Gasket Eliminator Flange Sealant	Rigid, high temp.	50ml	25555A
515 Master Gasket Flange Sealant	General purpose up to 0.5mm	50ml	51531A
518 Master Gasket Flange Sealant	General purpose up to 0.5mm	50ml	25583A
534 Hi-Tack Gasket Dressing & Sealant Stick	Semi-solid	19g	40392
548 Gasket Eliminator Flange Sealant Stick	Semi-solid	18g	40393
561 PST Pipe Sealant Stick with PTFE	Semi-solid, controlled strength	19g	37776
567 PST Pipe Sealant with PTFE	High temperature, solvent resistant	50ml	56747A
609 Retaining Compound	Press fit, general purpose	50ml	30015
620 Retaining Compound	Slip fit, high temperature	50ml	62050
641 Retaining Compound	Press and slip fits, low strength	50ml	21315
660 Quick Metal® Retaining Compound	Press Fit Repair	50ml	66040A
668 Retaining Compound Stick	Semi-solid, slip fit, high temperature	19g	40391
7649 Primer "N"	Anaerobic primer/cleaner	100ml	22410
C5-A® Copper Based Anti-Seize Lubricant	General purpose up to 890°C	453g	51007
Food Grade Anti-Seize	NSF Approved up to 360°C	226g	51168
Heavy Duty Anti-Seize	Metal free, high lubricity	510g	51606
Silver Grade Anti-Seize	General purpose up to 870°C	500g	76769
Silver Grade Anti-Seize Stick	Semi-solid, general purpose	20g	37783
Fixmaster® Marine Chocking	ABS Approved	9kg	97572
Fixmaster Stainless Steel Putty	Stainless steel filled repair epoxy	454g	97443
Fixmaster Steel Putty	Steel filled repair epoxy	454g	99913
Fixmaster Superior Metal	Ferro-silicon filled repair epoxy	408g	97473
Fixmaster Wear Resistant Putty	Ceramic fibre filled epoxy	454g	98742
Fixmaster Superior Metal	Ferro-Silicon filled repair epoxy	408g	97473
Nordbak® Brushable Ceramic- White	Smooth, corrosion resistant coating	907g	96443
Nordbak Brushable Ceramic- Grey	Smooth, corrosion resistant coating	907g	98733
Nordbak Chemical Resistant Coating	Protection against chemical attack	5.43kg	96092
Nordbak High Temperature Brushable Ceramic	Protection up 260°C	907g	96433
Nordbak Wearing Compound	Trowelable, large ceramic beads	2.3kg	99813
ODC Free Cleaner and Degreaser	General purpose cleaner	473ml	20162
Chisel Gasket Remover	Aggressive gasket remover	510g	79040
Loctite Instant Gasket	Superior bonding to oil contaminated metals	198g	30507







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