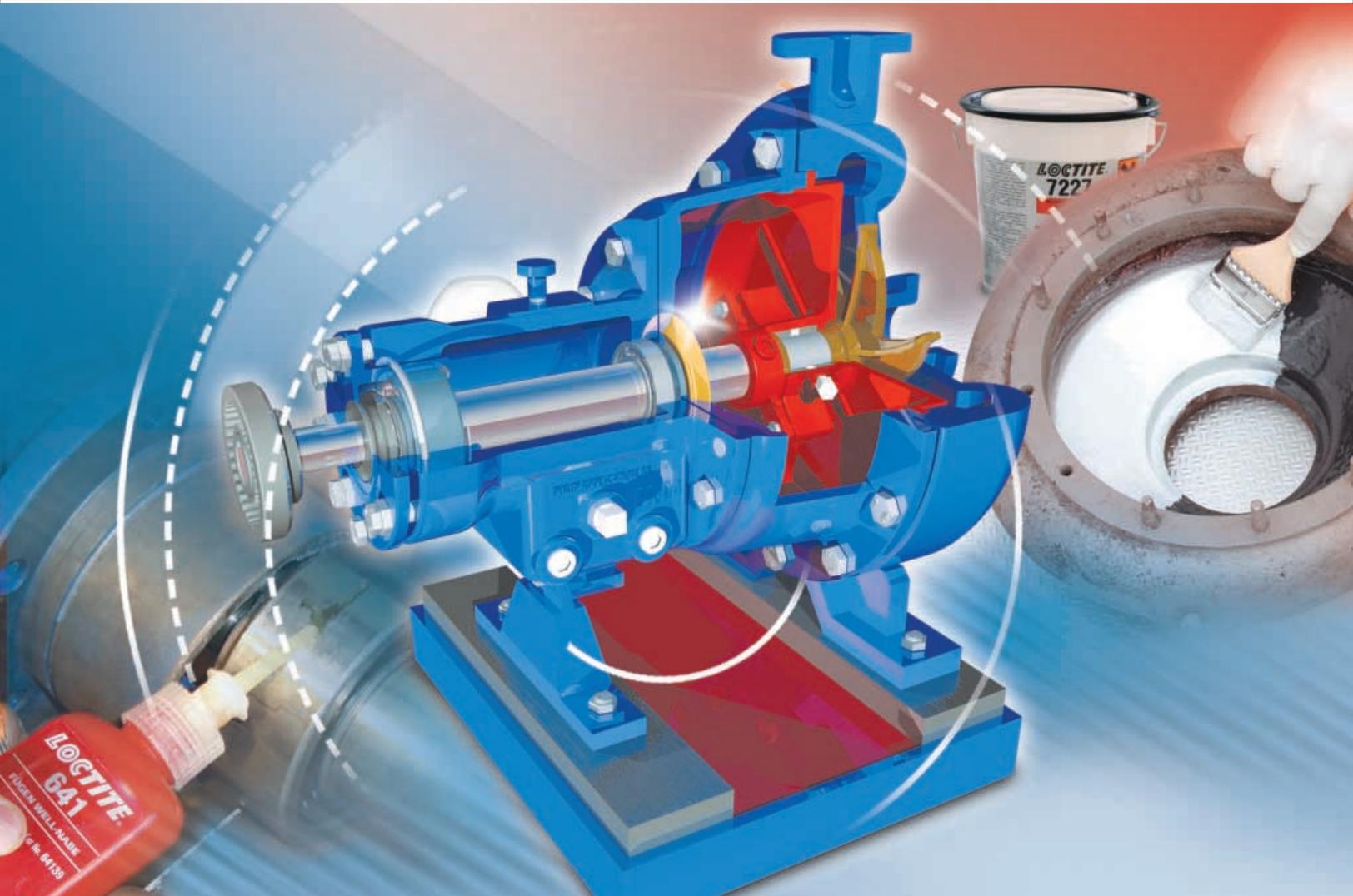


LOCTITE®

Industrial Pumps Rebuild and Maintenance Guide



Henkel





Introduction

This guide has been developed to assist maintenance personnel who service industrial centrifugal pumps in achieving their goals of pump reliability, longevity and cost reduction.

Most industrial centrifugal pumps carry a significant capital equipment value and it is therefore important to extend their useful lives and ensure that they run efficiently and reliably. Proactive maintenance can reduce the risk of breakdowns and increase pump reliability and longevity.

Many pump breakdowns are the result of simple, needless 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. Taking some proactive steps can reduce the risk of this occurrence.

Loctite® products help to prevent common failures and extend end-product life in the OEM sector worldwide. These same technologies are used by the people who maintain equipment. Various Loctite® technologies can be used in all stages of pump maintenance:

- Assembly
- Installation
- Repairs
- On-going maintenance
- Disassembly

The use of Loctite® products in a proactive maintenance program can:

- Prevent common failures, both major and minor
- Allow for the recycling of parts to avoid scrap and replacement costs
- Assist in disassembly
- Help ensure reliability and a consistent running condition

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. Proven reliability applications and techniques are discussed, starting with the bearing housing all the way through to the final assembly of the pump casing and attaching the coupling.

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® products 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® products 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 from Henkel.

Contact your local Henkel representative for help to meet your specific product application needs.

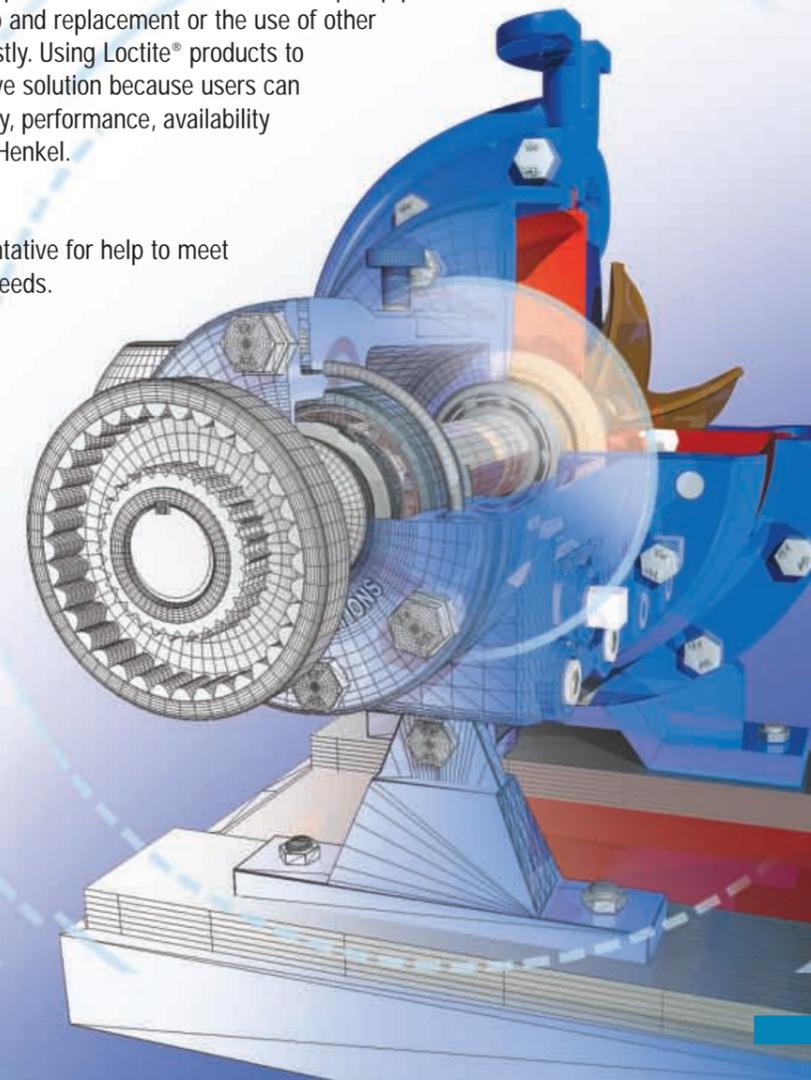




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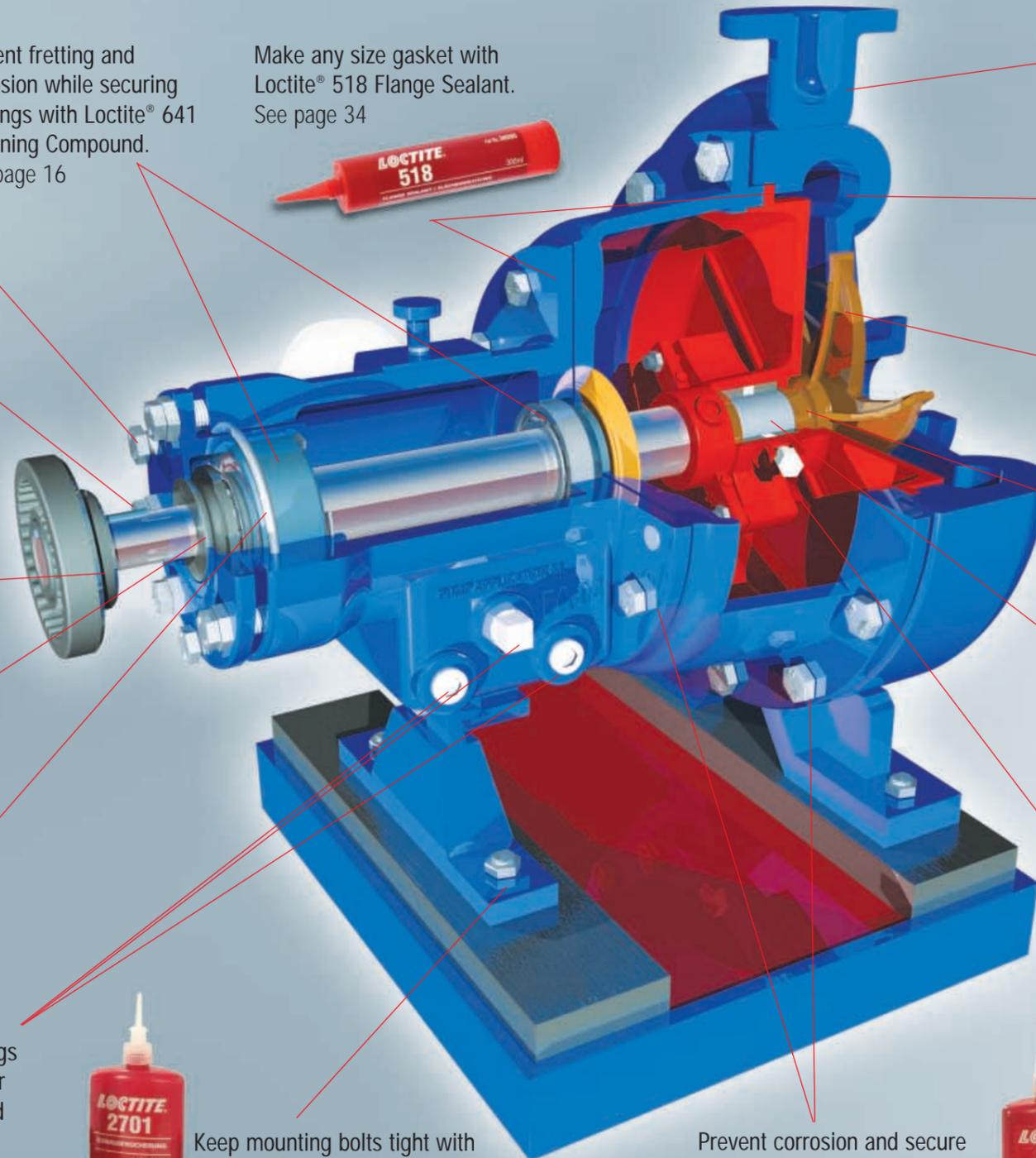
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Protect pump against chemical attack and erosion with Loctite® Nordbak® 7221 Chemical Resistant Coating. See page 52 + 58



Prevent key wallow with Loctite® 243 Threadlocker or repair key wallow with Loctite® 660 Retaining Compound. See page 40 + 42

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Bearing Frame and Housing



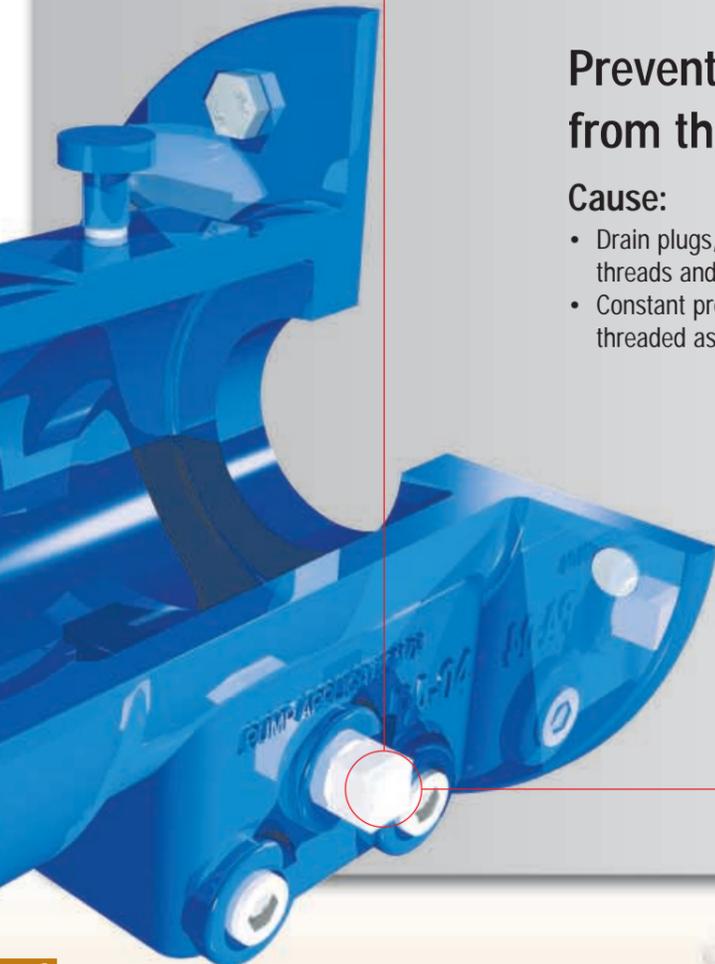
CHALLENGE



Prevent oil leaks from threaded assemblies

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® 577 or 572 Thread Sealants

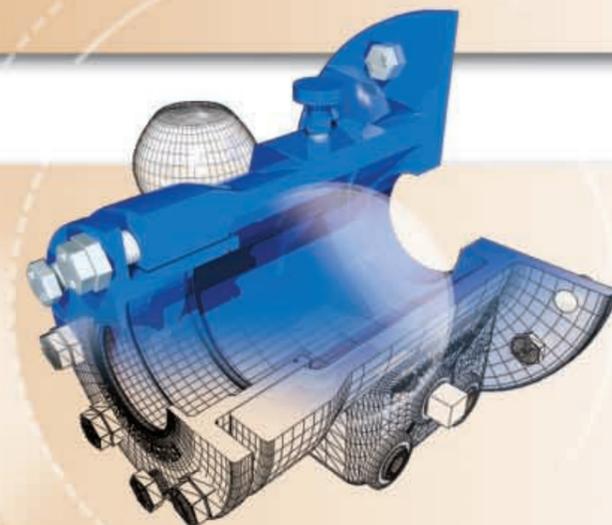
- Loctite® 572 Thread Sealant is designed to cure only when enclosed in metal, such as in a threaded assembly
- Once cured, moisture and oil cannot penetrate this barrier as the pressure changes within the bearing housing
- The thread sealant prevents fittings from loosening, yet allows for easy disassembly with normal hand tools
- Use Loctite® 577 for instant low pressure seal

Steps:

1. Clean parts of contamination with Loctite® 7063. If necessary, spray Loctite® 7649 Primer or Loctite® 7240 Activator onto threaded parts (male and female), allow to dry
2. Apply a band of Loctite® 572 Thread Sealant 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

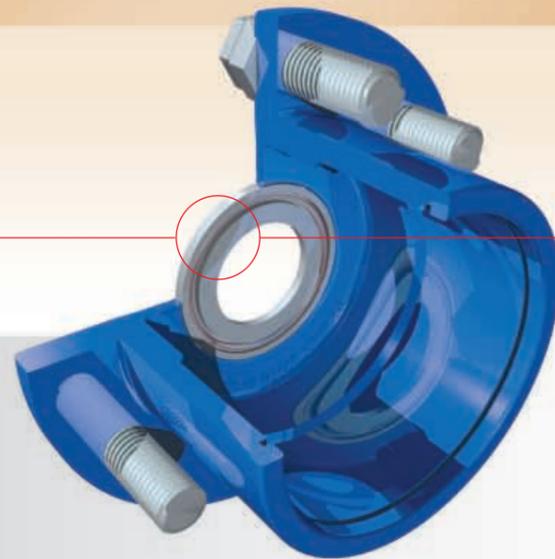




Bearing Frame and Housing



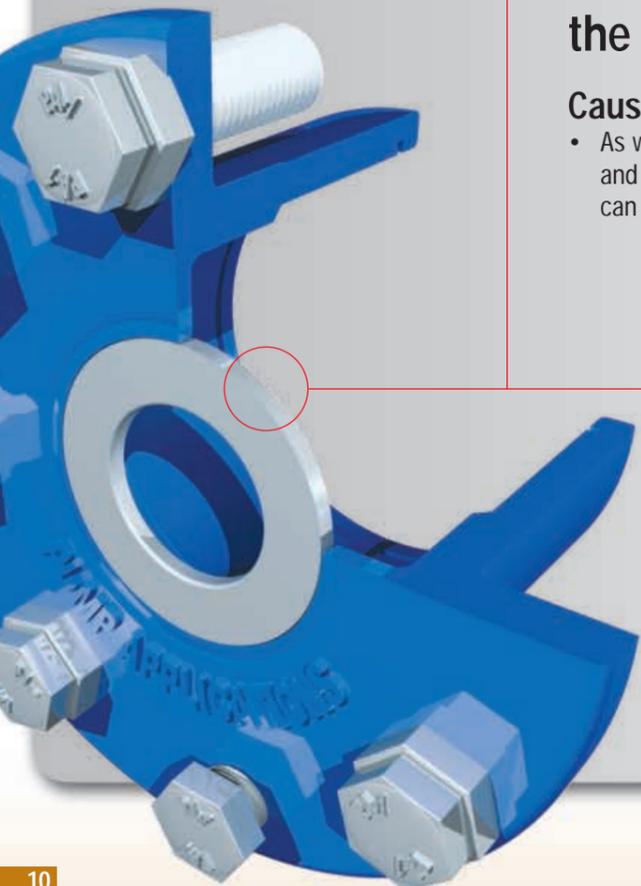
CHALLENGE



Prevent leaks and seizures between the bearing housing and oil seal

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

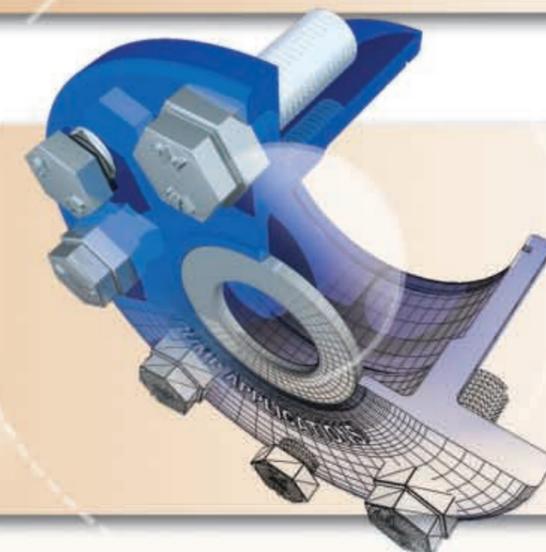
- Fill the air spaces by applying a Loctite® 243 or 248 Medium Strength Threadlocker to the outside diameter of the oil seal

Steps:

1. Clean the outside diameter of the oil seal and the inside diameter of the bearing housing with Loctite® 7063 Cleaner & Degreaser
2. Apply Loctite® 243 or 248 Medium Strength Threadlocker to the outside diameter of the oil seal
3. Wipe off any excess and press into housing using normal techniques

RESULTS

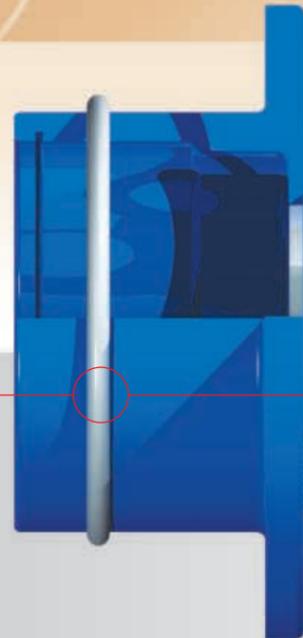
- A sealed assembly eliminates leaks, contamination, and corrosion
- Elimination of clean up and hazards associated with oil seal leaks
- Less oil consumption
- Reduced risk of running low on lubricant
- Service of the pump is easier
- The oil seal can be easily removed with a screwdriver during the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





Bearing Frame and Housing

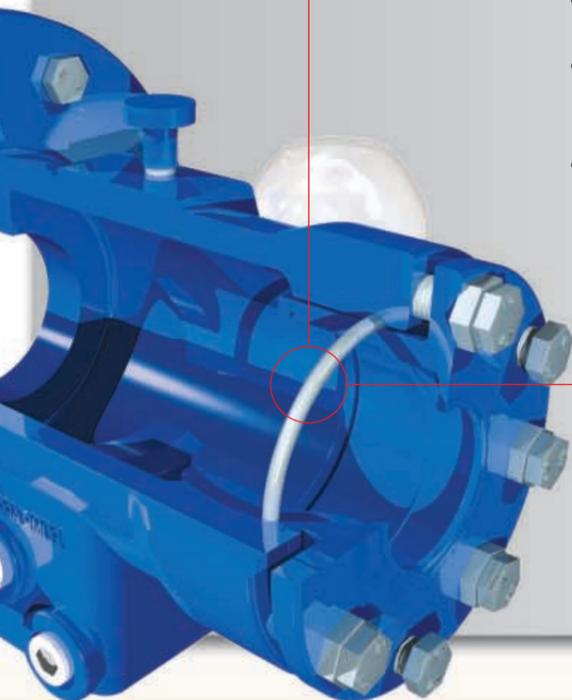
CHALLENGE



Keeping o-rings pliable to ensure a proper seal

Cause:

- The typical pump environment is very humid and water washout can remove lubricants from the o-ring
- When adjustments are made to the impeller this creates sliding abrasion and potential damage to the o-ring and ultimately leads to the loss of sealing
- O-rings cannot be serviced once installed and may begin to dry out



SOLUTION

- Lubricate o-rings with Loctite® 8104 Food Grade Silicone Grease

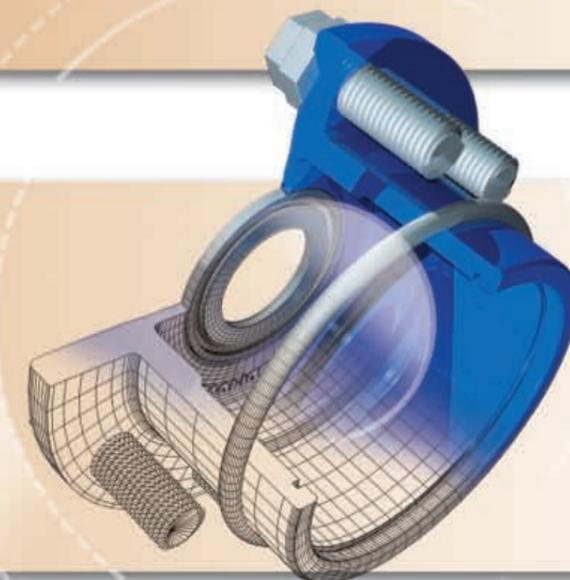
- Loctite® 8104 Food Grade Silicone Grease provides good lubrication over extended periods of time and has excellent water washout resistance

Steps:

1. Clean o-ring to remove any grit or contaminants
2. Apply Loctite® 8104 Food Grade Silicone Grease to the o-ring by smearing it to completely cover the entire surface
3. Slide o-ring over the bearing housing and into the o-ring groove

RESULTS

- Lubricated o-rings remain pliable and capable of sealing oil in and contaminants out
- O-rings prevented from adhering to the bearing frame





Bearing Frame and Housing



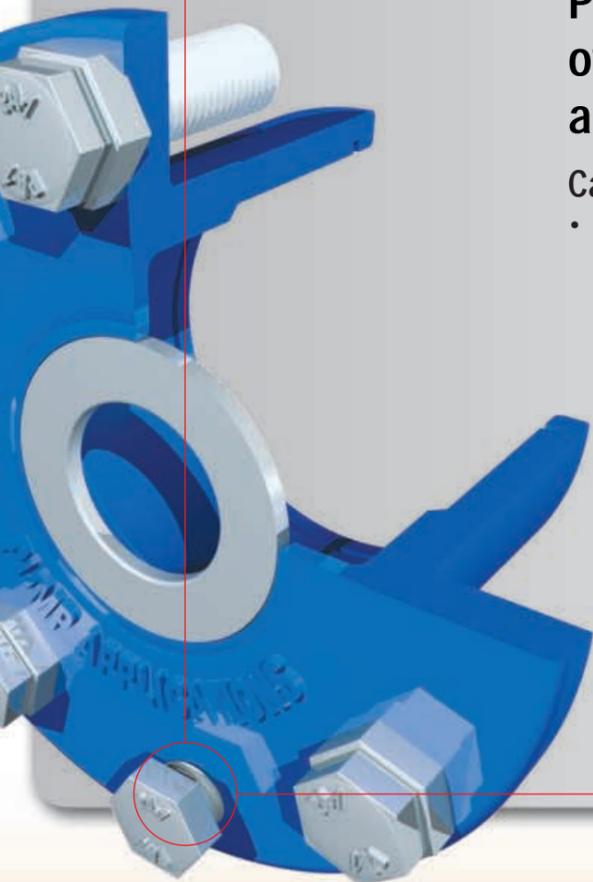
CHALLENGE



Prevent corrosion and seizure of power end jack bolts, jam nuts and clamp bolts

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® 8023 Marine Grade Anti-Seize to the power end bolts

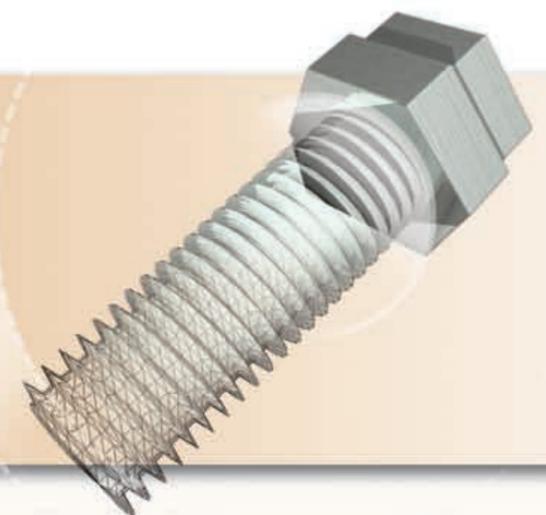
- Loctite® 8023 Marine Grade Anti-Seize is metal-free and has superior water washout resistance

Steps:

- Apply Loctite® 8023 Marine Grade Anti-Seize liberally to the bolt threads
- Assemble jam nuts onto the bolts
- 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





Bearing Frame and Housing

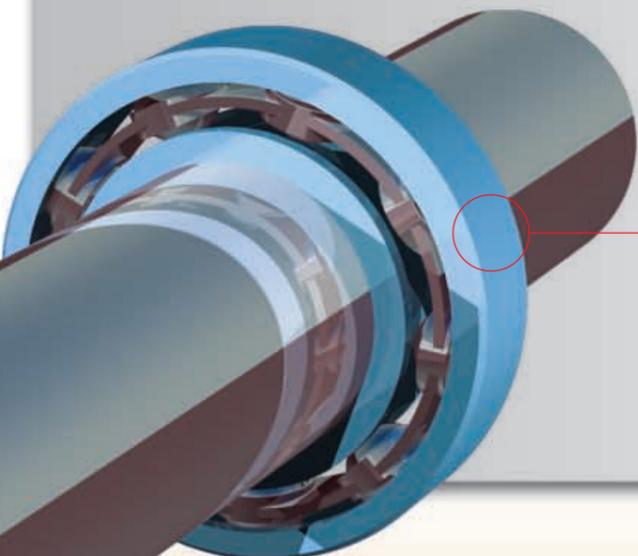
CHALLENGE



Prevent bearing spinout, corrosion and component damage

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 #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® 7063 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 #2

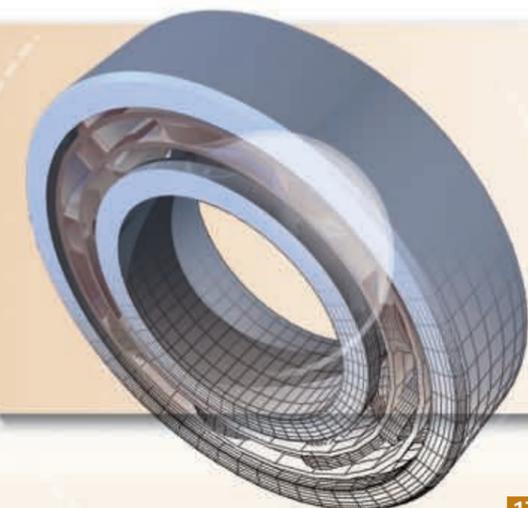
- Inboard Bearing – Apply Loctite® 641 Retaining Compound to the inside diameter of the inboard bearing

Steps:

1. Clean parts with Loctite® 7063 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

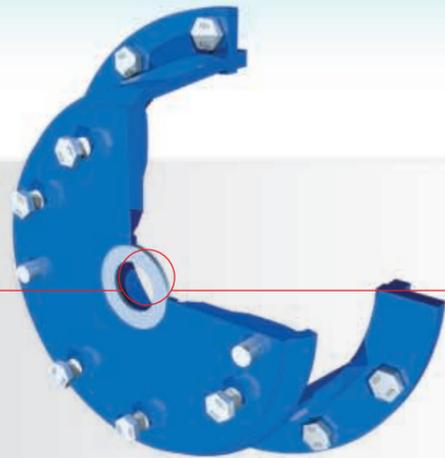




Frame Adapter



CHALLENGE



Prevent oil leaks between the frame adapter and the oil seal

Cause:

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



SOLUTION

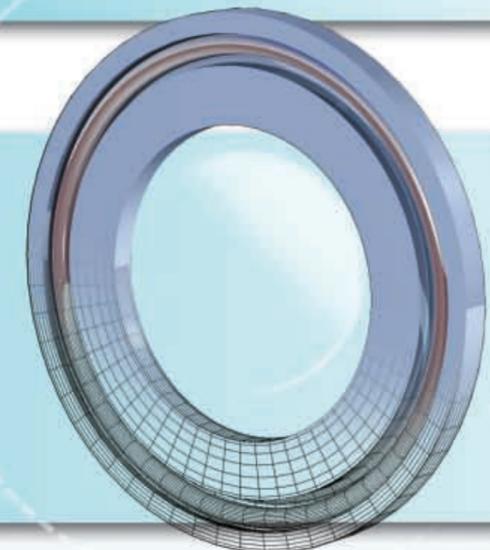
- Fill the air spaces by applying a Loctite® 243 or 248 Medium Strength Threadlocker to the outside diameter of the oil lip seal
 - A Loctite® Medium Strength Threadlocker allows the oil seal to be easily removed with a screwdriver during the next overhaul

Steps:

1. Clean the outside diameter of the oil seal and the inside diameter of the frame adapter with Loctite® 7063 Cleaner & Degreaser
2. Apply Loctite® Medium Strength Threadlocker 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





Frame Adapter

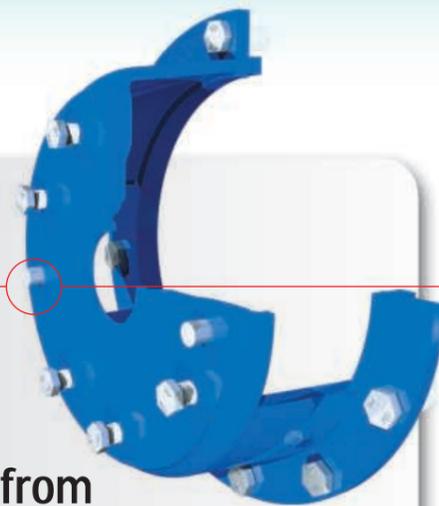


CHALLENGE

Prevent dowel pins from seizing to the bearing frame and frame adapter

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® 8023 Marine Grade Anti-Seize to the dowel pins

- Loctite® 8023 Marine Grade Anti-Seize Compound provides a protective coating to parts that are exposed to severe heat and moisture

Steps:

- Clean the parts
- Apply Loctite® 8023 Marine Grade Anti-Seize to the pins
- 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

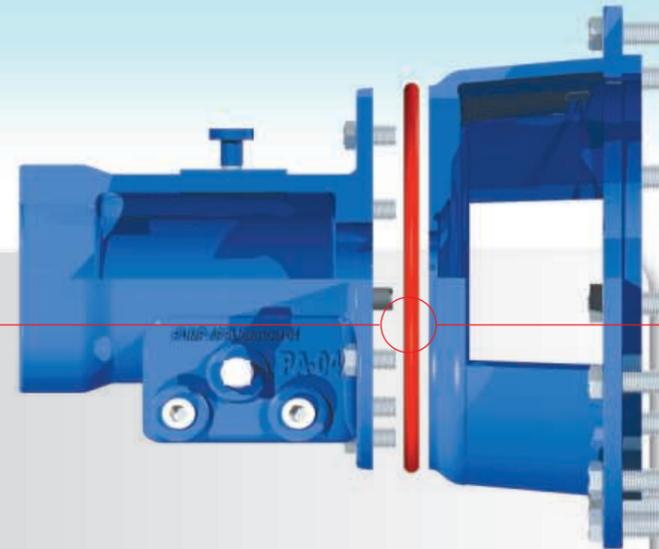




Frame Adapter



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



SOLUTION

• Apply Loctite® 518 Flange Sealant to the flange face of the frame adapter

- Loctite® 518 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
 - Loctite® 518 Flange Sealant can cure through fairly large gaps and surface imperfections
- Note: In some cases the cut gasket is required for spacing. In this case, apply Loctite® 5922 Flange Sealant to both sides of the gasket as a shellac

Steps:

1. Remove old gasketing material and other heavy contaminants with Loctite® 7200 Gasket Remover
 2. Clean both flange surfaces with Loctite® 7063 Cleaner & Degreaser
 3. Spray Loctite® 7649 Primer or Loctite® 7240 Activator on only one flange surface and allow to dry
 4. Apply a continuous bead of Loctite® 518 Flange Sealant to the other surface
 5. Assemble parts and tighten as required
 6. Allow to cure:
 - No pressure: immediate service
 - Low pressure: 1 hour
 - High pressure: 4 hours
 - Full performance of product: 24 hours
- Note: Circle bolt holes with sealant if appropriate

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

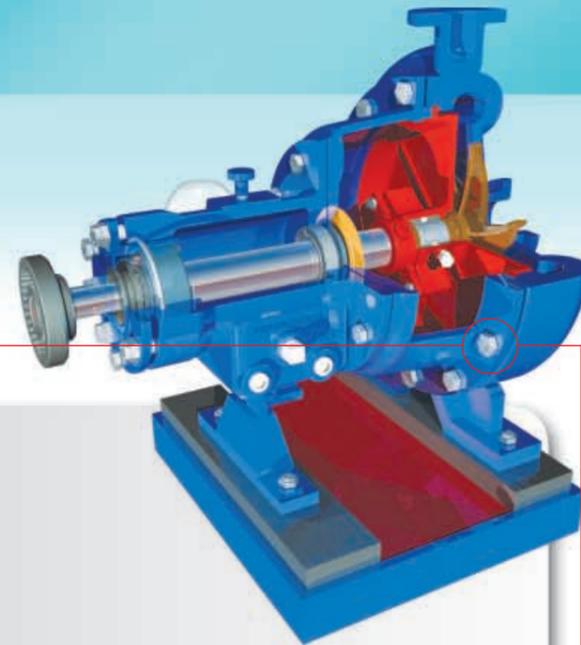




Frame Adapter



CHALLENGE



Prevent fastener loosening and corrosion to frame adapter mounting bolts

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

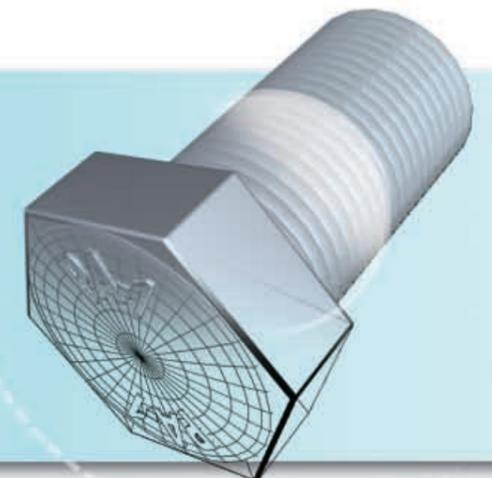
- Apply Loctite® 243 or 248 Medium Strength Threadlocker to the frame adapter bolts

Steps:

1. Clean threads with Loctite® 7063 Cleaner & Degreaser
2. Apply several drops of Loctite® 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 Flange Sealant is used instead of a cut gasket) which eliminates leaks





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® 8023 Marine Grade Anti-Seize to the studs

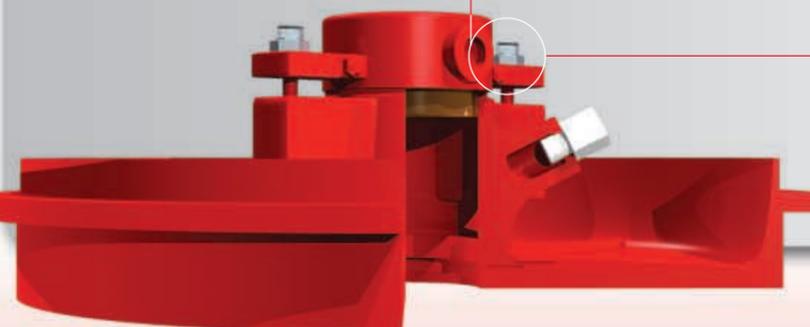
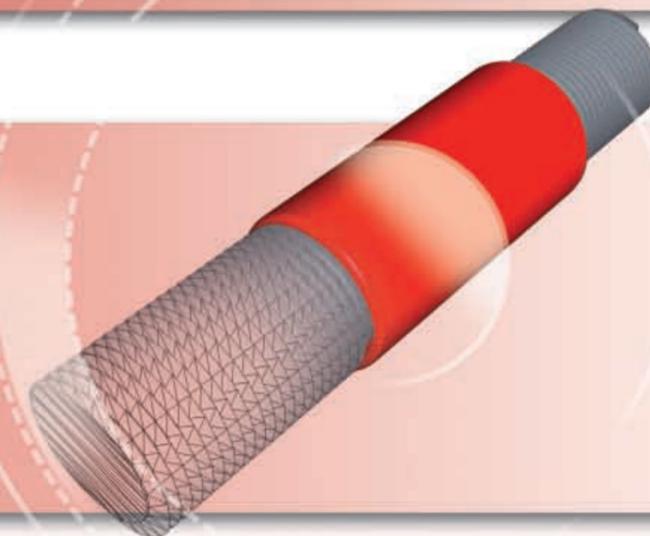
- Loctite® 8023 Marine Grade Anti-Seize is metal-free and is designed to have superior water washout resistance, a key feature in a gland application

Steps:

1. Clean the parts
2. Apply Loctite® 8023 Marine Grade 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





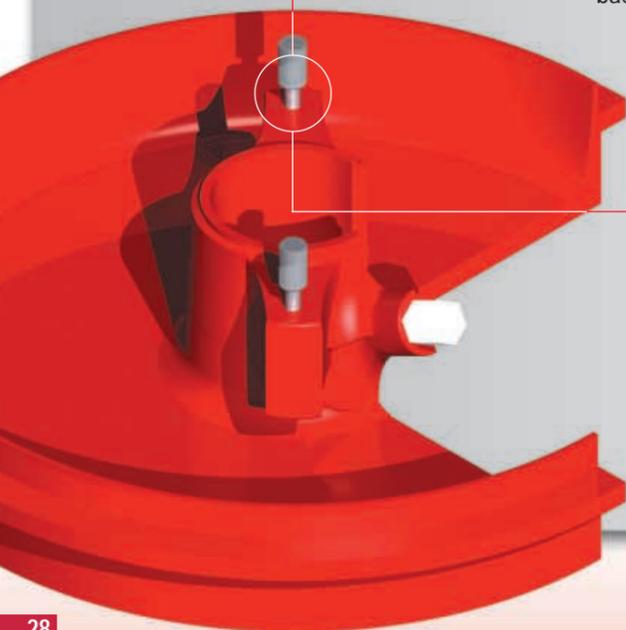
CHALLENGE



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

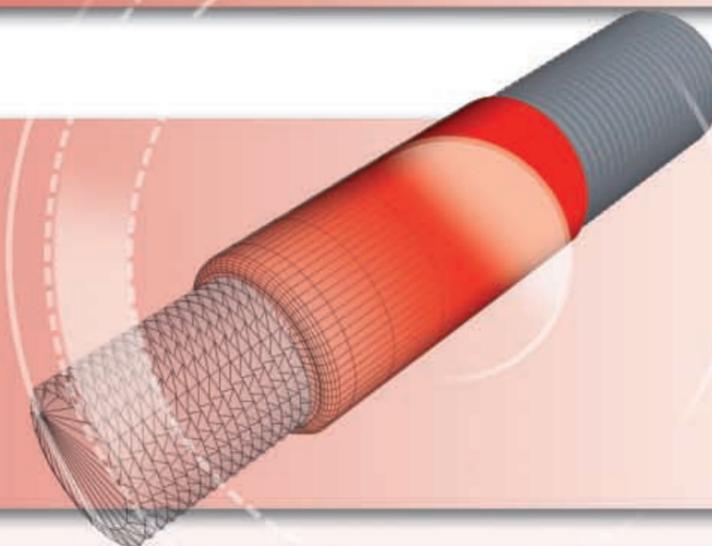
Apply Loctite® 2701 High Strength Threadlocker

Steps:

1. Place several drops of Loctite® 2701 High Strength Threadlocker down the side of the female threads
2. Apply several drops of Loctite® 2701 Threadlocker onto the stud threads
3. Install the studs

RESULTS

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





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® 572 Thread Sealant

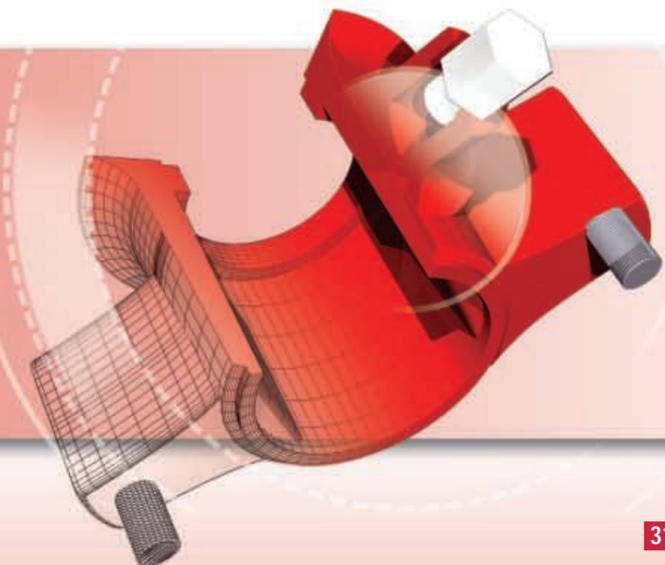
- Loctite® 572 Thread Sealant fills the air space within the threads
- Allows the flushing connector to be removed with normal hand tools when necessary

Steps:

1. Clean the parts with Loctite® 7063 Cleaner & Degreaser
2. Apply a band of Loctite® 572 Thread Sealant to male threads starting one to two threads from the end of the fitting
3. Assemble parts snugly. Do not overtighten

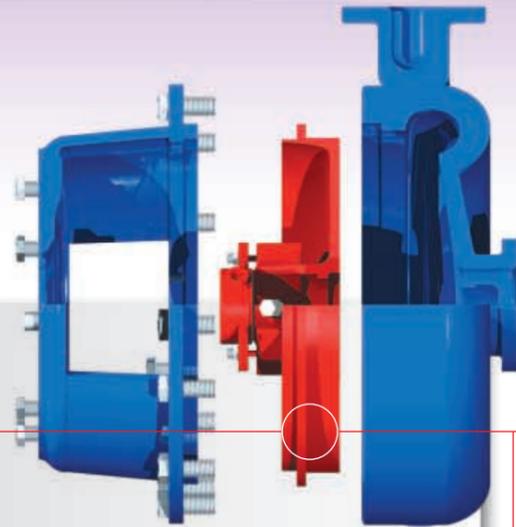
RESULTS

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





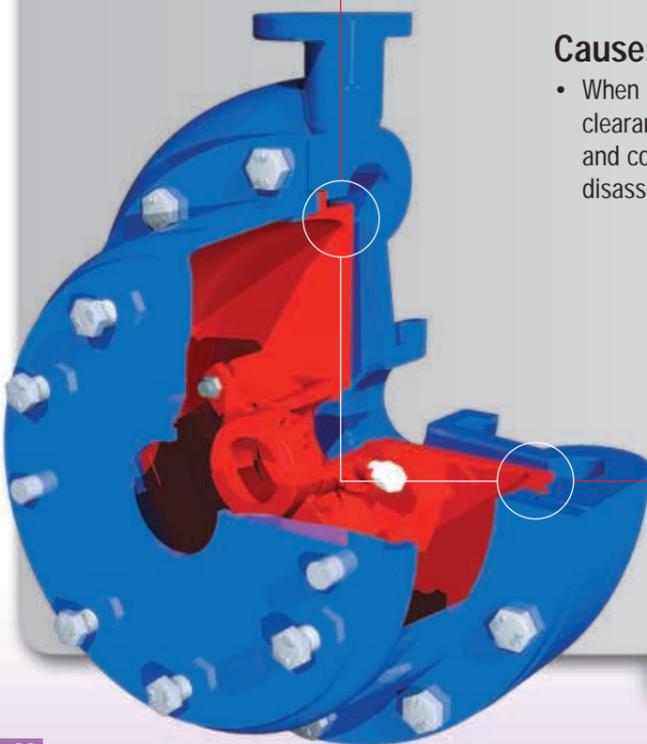
CHALLENGE



Prevent the frame adapter, stuffing box and casing from seizing together

Cause:

- When assembling these components, 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 Loctite® 8023 Marine Grade Anti-Seize compound during assembly

- Loctite® Anti-Seize compounds have superior water washout resistance, they will stay where they are applied

Steps:

1. Clean the parts
2. Apply Loctite® 8023 Marine Grade Anti-Seize to the outside diameter of the stuffing box at the mating point
3. Assemble components as usual

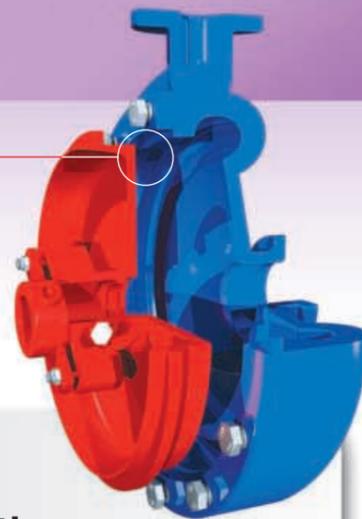
RESULTS

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





Pump Casing



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 #1

Replace the cut gasket and apply Loctite® 518 Flange Sealant to the flange surface

- Direct metal-to-metal contact along with the use of Loctite® 518™ 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® 7200 Gasket Remover
2. Clean both flanges with Loctite® 7063 Cleaner & Degreaser
3. Spray Loctite® 7649 Primer or Loctite® 7240 Activator on only one surface and allow 1–2 minutes to dry
4. Apply a continuous bead of Loctite® 518 Flange Sealant to the other surface

Note: Circle all bolt holes, if appropriate

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

SOLUTION #2

Coat the gasket material with Loctite® 5922 Flange Sealant

- If there is not enough clearance between the impeller and the casing to eliminate the gasket, the cut gasket must be used
- Loctite® 5922 Flange Sealant will fill all the air space that cut gaskets simply cannot fill
- Loctite® 5922 Flange Sealant will withstand expansion and contraction caused by pressure and temperature changes

Steps:

1. Remove old gasketing material with Loctite® 7200 Gasket Remover
2. Clean both flanges with Loctite® 7063 Cleaner & Degreaser
3. Spray Loctite® 7649 Primer or Loctite® 7240 Activator to both flange faces and both sides of the gasket. Allow 1–2 minutes to dry
4. Smear Loctite® 5922 Flange Sealant to both sides of the pre-cut gasket
5. Assembly and tighten as required
6. Allow to cure

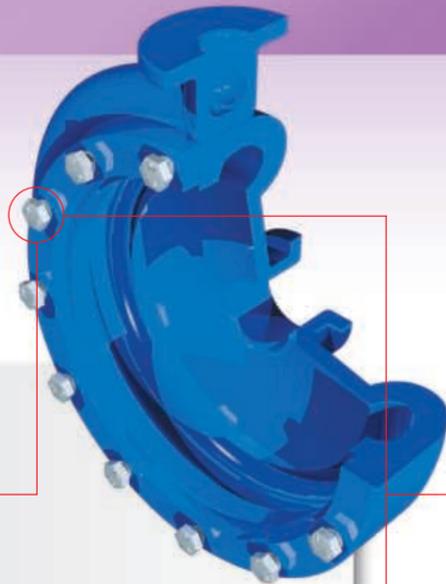
RESULTS

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





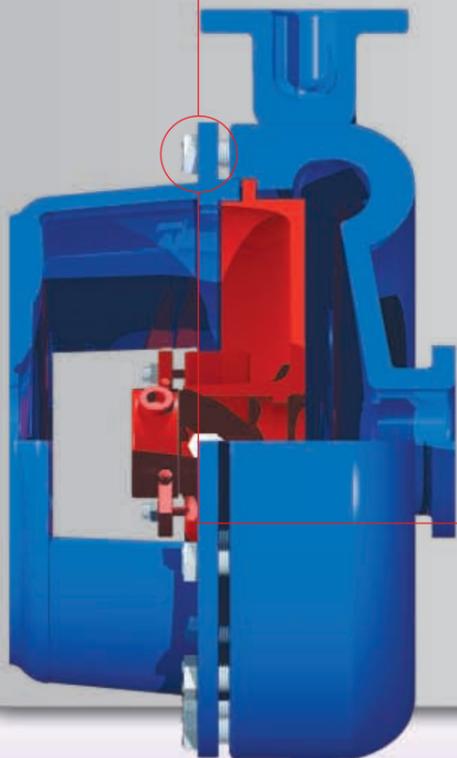
CHALLENGE



Prevent corrosion and seizure of the pump casing bolts

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 labour associated with drilling and tapping the bolt hole



SOLUTION

- Apply Loctite® 243 Medium Strength Threadlocker in the bolt holes prior to assembling the casing

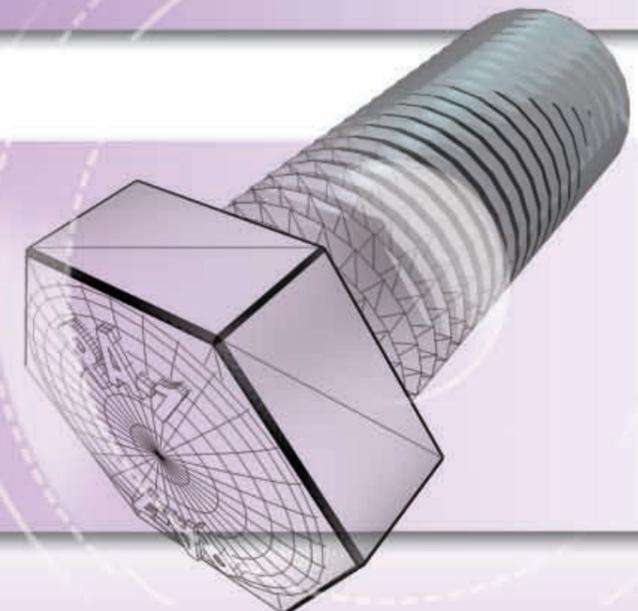
- Loctite® 243 Threadlocker fills all the air space within the threads

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





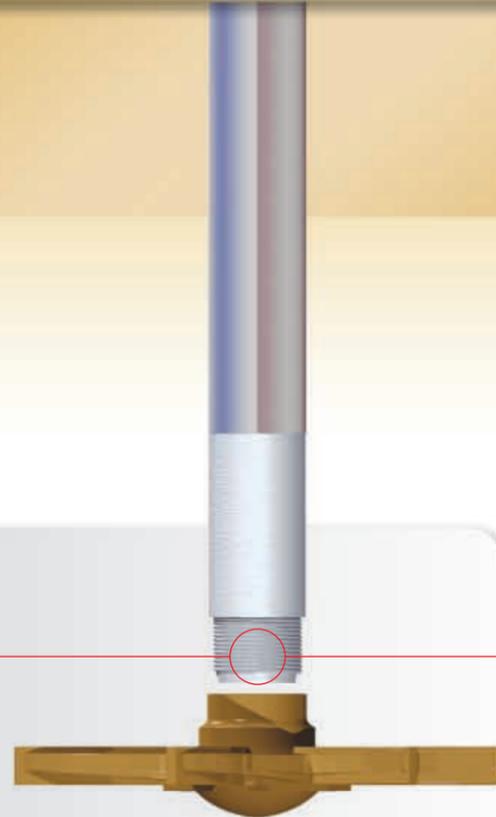
CHALLENGE



Prevent seizure of the impeller to the shaft

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

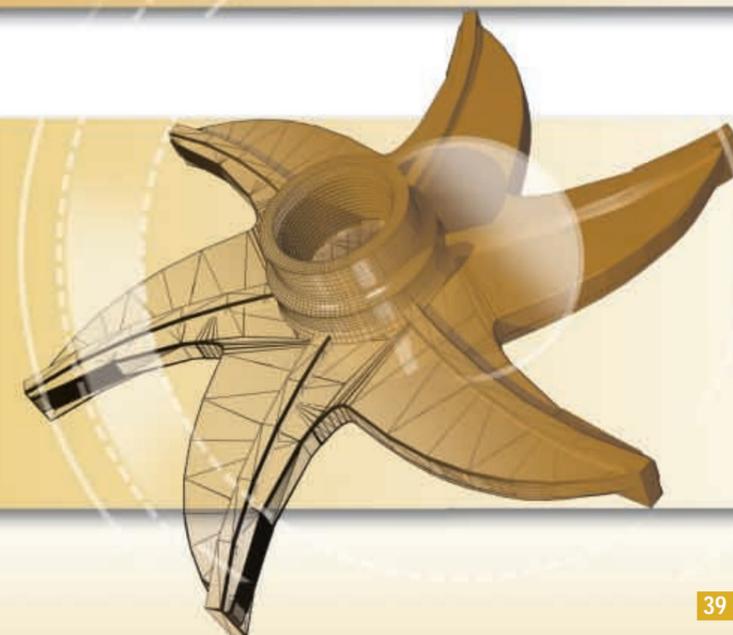
- Apply Loctite® 8023 Marine Grade Anti-Seize compound to the shaft threads prior to impeller assembly

Steps:

1. Clean the shaft and impeller threads
2. Apply Loctite® 8023 Marine Grade Anti-Seize to the shaft threads
3. Assemble the impeller using normal techniques

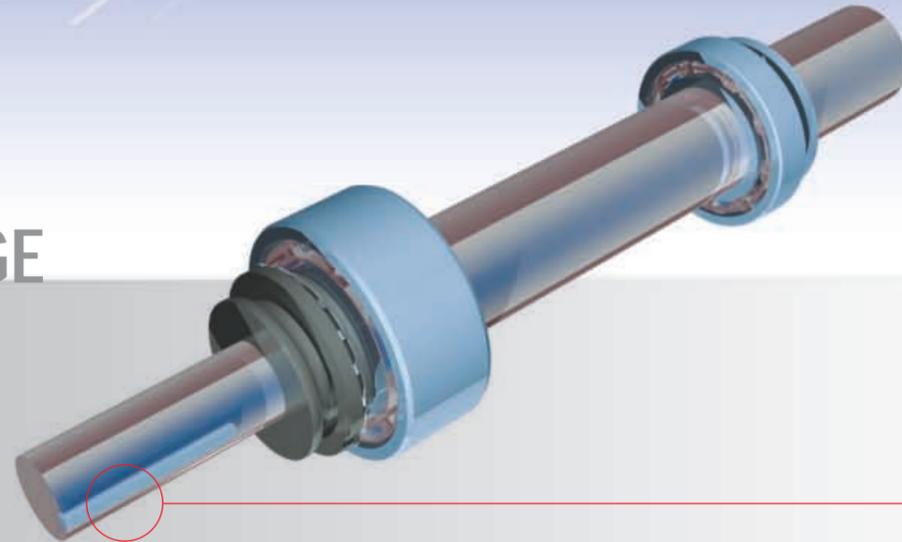
RESULTS

- Prevention of seizure
- Easier disassembly





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 Loctite® 243 Medium Strength Threadlocker to the keyway and then insert the key stock

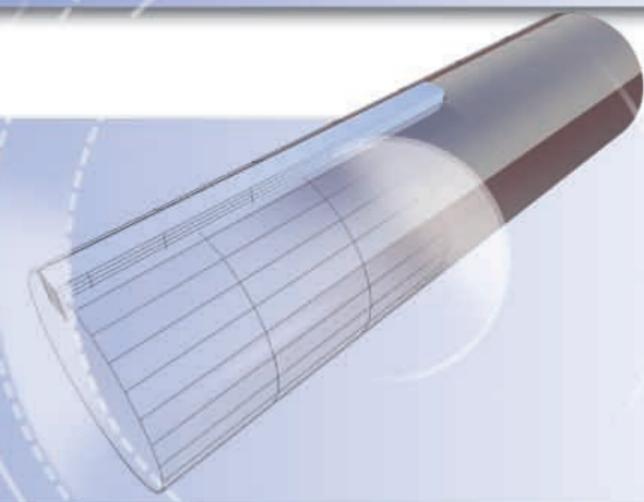
- The viscosity of a Loctite® Medium Strength Threadlocker is appropriate for the gap fill and provides the proper amount of strength, while allowing for easy removal
- If the key needs to be removed, simply use a hammer to tap a metal chisel or drift against the key stock to pop it out of the keyway

Steps:

1. Clean the keyway and key stock with Loctite® 7063 Cleaner & Degreaser
2. Apply several drops of Loctite® 243 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





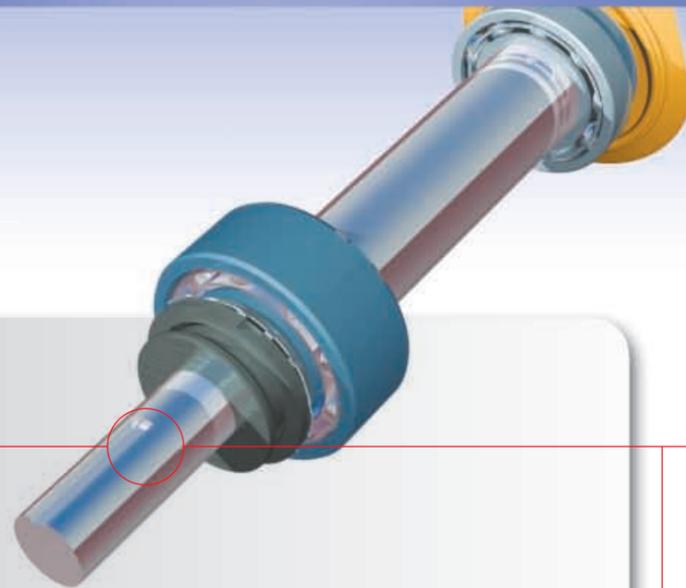
CHALLENGE



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® 660 Quick Metal 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

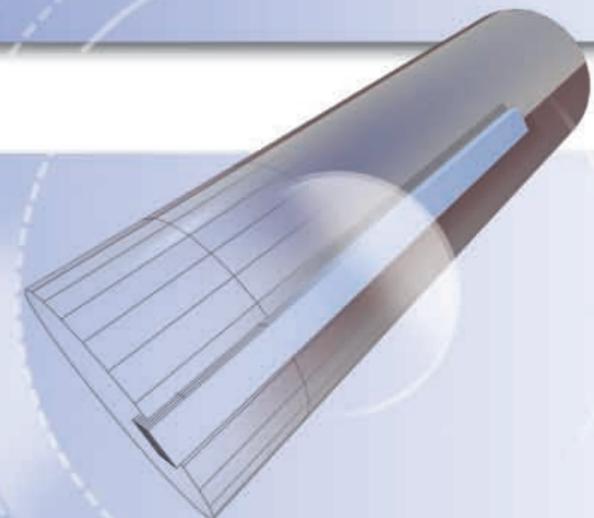
Steps:

1. Clean the keyway and key stock with Loctite® 7063 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





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

• Loctite® 243 Medium and Loctite® 222 Low Strength Threadlockers

Steps:

1. Clean set screw with Loctite® 7063 Cleaner & Degreaser
2. If necessary, spray all threads with Loctite® 7649 Primer or Loctite® 7240 Activator and allow to dry
3. Apply a couple of drops of a Loctite® 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

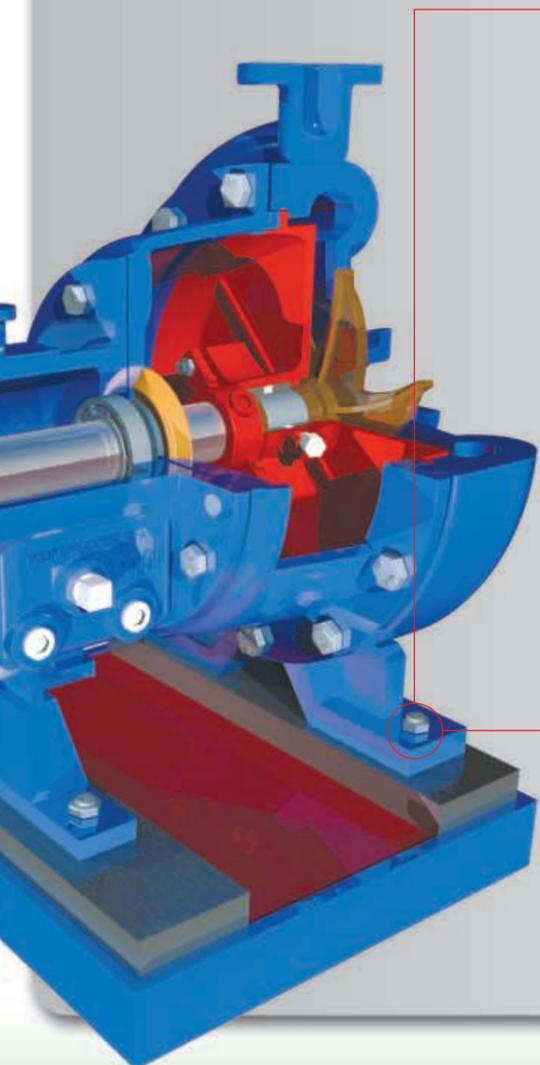




Pump Base Mounting



CHALLENGE



Prevent pump mounting bolts from losing clamp load, leading to misalignment

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 #1

• Apply Loctite® 2701 High Strength Threadlocker to the mounting bolts

Steps:

1. Clean threads with Loctite® 7063 Cleaner & Degreaser
2. Apply several drops of Loctite® 2701 High Strength Threadlocker to the mounting bolts
3. Assemble and tighten as usual

SOLUTION #2

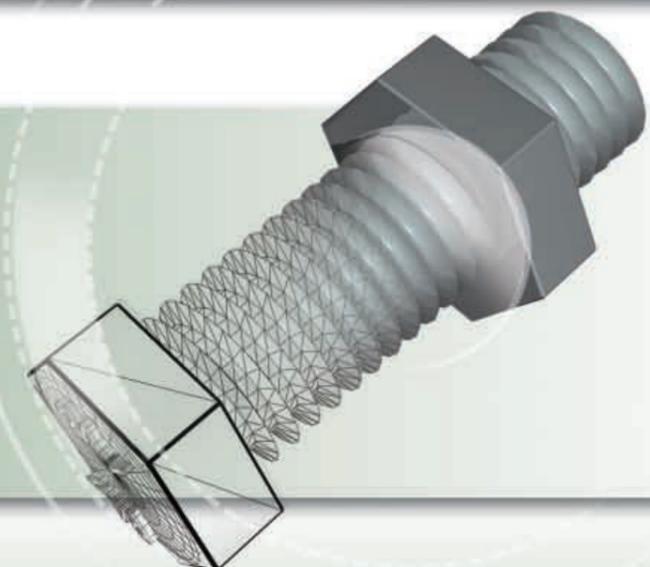
• Apply Loctite® 290 Wicking Grade Threadlocker to the mounting bolts after the pump has been levelled and aligned

Steps:

1. Clean the parts with Loctite® 7063 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





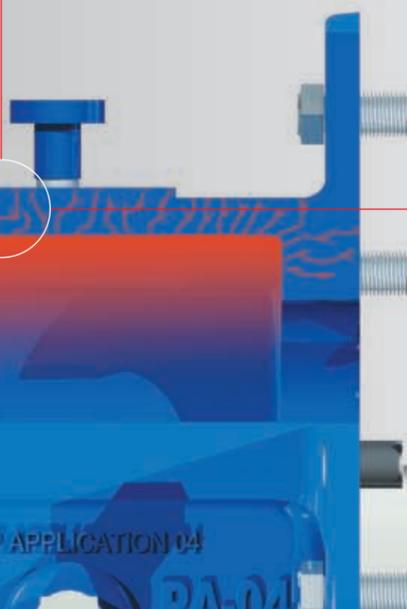
CHALLENGE



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 #1

• Coat interior of bearing frame to seal porosities with Loctite® Nordbak® 7221 Chemical Resistant Coating

Steps:

1. Remove visible and invisible contaminants. Clean with Loctite® 7063 Cleaner & Degreaser
2. Abrasive blast the surface to a near white metal finish. Remove dust. Clean with Loctite® 7063 Cleaner & Degreaser
3. Mix and apply Loctite® Nordbak® 7221 Chemical Resistant Coating to the interior of the bearing frame, min 0.5 mm thick, using two coats. Apply second coat when gel time of first coat is reached

SOLUTION #2

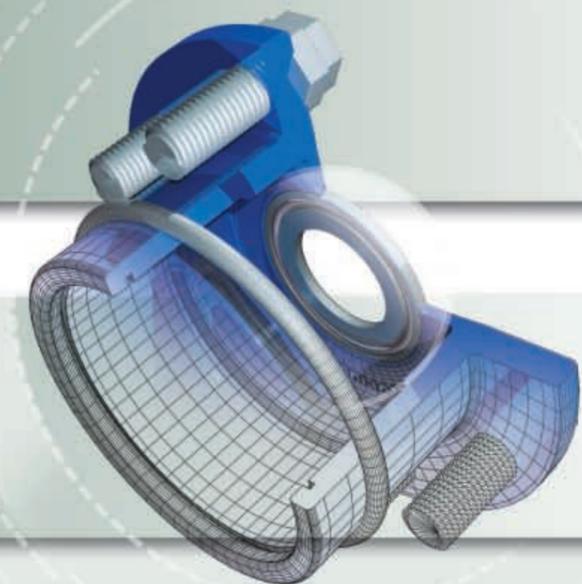
For a part where the specific leak points are known, brush on Loctite® 290 Wicking Grade Threadlocker

Steps:

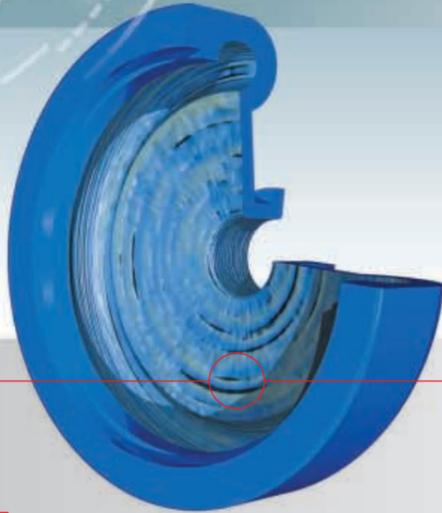
1. Clean the surface
2. Bake it dry
3. Brush on Loctite® 290 Threadlocker
4. Allow to cure

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 #1

- Rebuild minor surface wear, or rebuild worn areas of the casing and impeller. Apply Loctite® 3478 Superior Metal or Loctite® Nordbak® 7222 Wear Resistant Putty to rebuild worn cutwaters, wear ring seats, impeller vane tips, or other specific areas of the casing. Coat with the surface with Loctite® Nordbak® 7227 or 7228 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
- Use Loctite® 3478 Superior Metal to rebuild worn areas, where machining is required to reach the desired dimensions
- Use Loctite® 7222 Wear Resistant Putty to rebuild worn areas on places where cavitation and wear are constantly present. Product is not machinable

Steps:

1. Remove visible and invisible contaminants. Clean with Loctite® 7063 Cleaner & Degreaser
2. Abrasive blast the surface to a near white metal finish. Remove dust. Clean with Loctite® 7063 Cleaner & Degreaser
3. Rebuild the surface with Loctite® 3478 Superior Metal or Loctite® 7222 Wear Resistant Putty. Mix and apply products according to the package instructions
4. Apply a coat of Loctite® Nordbak® 7228 Brushable Ceramic White. When gel time is reached, apply a second coat of Loctite® Nordbak® 7227 Brushable Ceramic Grey, to a min 0.5 mm final thickness, to allow for easy visual inspection of the coating and wear

Note: Use Loctite® 7232 High Temperature Wear Resistant Putty and Loctite® 7234 High Temperature Brushable Ceramic at elevated temperatures, up to 205 °C dry service temperature.

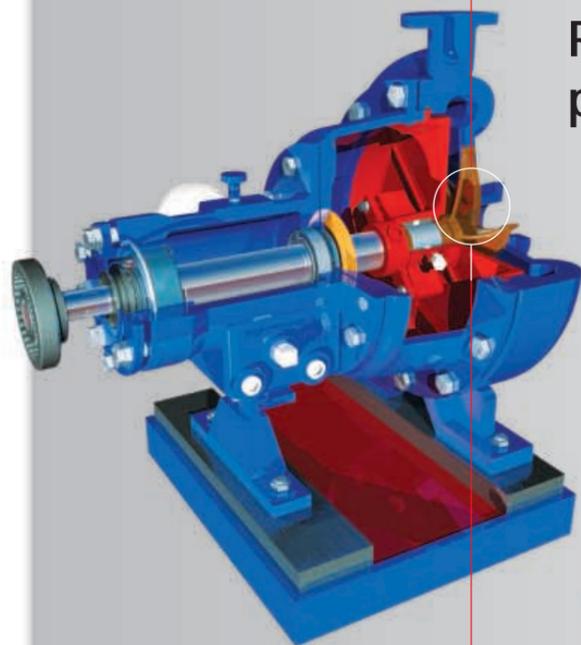


Casing / Impeller Wear

CHALLENGE



Rebuild worn areas to restore pump casing and impellers



SOLUTION #2

Repair damage from chemical attack and provide a protective coating. Coat the casing and the impeller with Loctite® Nordbak® 7221 Chemical Resistant Coating

- Protects parts in severe chemical environments

Steps:

1. Remove visible and invisible contaminants. Clean with Loctite® 7063 Cleaner & Degreaser
2. Abrasive blast the surface to a near white metal finish. Remove dust. Clean with Loctite® 7063 Cleaner & Degreaser
3. Mix and apply Loctite® Nordbak® 7221 Chemical Resistant Coating, min 0.5 mm thick, using two coats. Apply second coat when gel time of first coat is reached

SOLUTION #3

Repair heavy surface wear to the casing. Rebuild the casing with Loctite® Nordbak® 7218 or 7219 or 7230 or 7226 or 7229 Wearing Compound

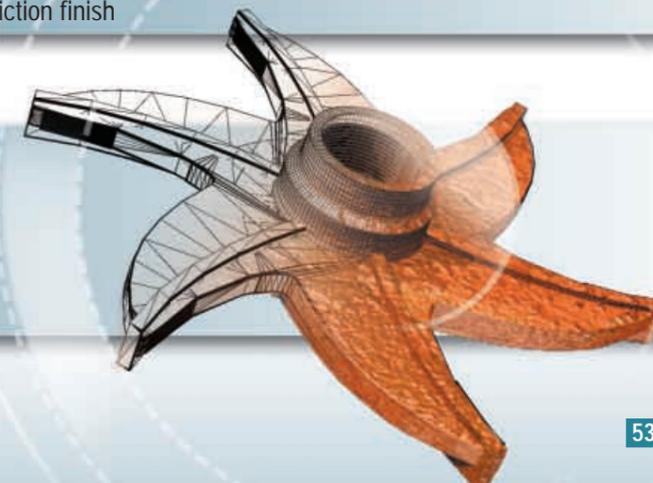
- Consult a Henkel Technical Specialist for correct product selection

Steps:

1. Remove visible and invisible contaminants. Clean with Loctite® 7063 Cleaner & Degreaser
2. Abrasive blast the surface to a near white metal finish. Remove dust. Clean with Loctite® 7063 Cleaner & Degreaser
3. Mix and apply the selected Loctite® Nordbak® Wearing Compound as per the package instructions
4. Apply a topcoat of Loctite® Nordbak® 7227 or 7228 or 7234 Brushable Ceramic. When gel time is reached, apply a second coat, to a min 0.5 mm final thickness, to provide a low-friction finish

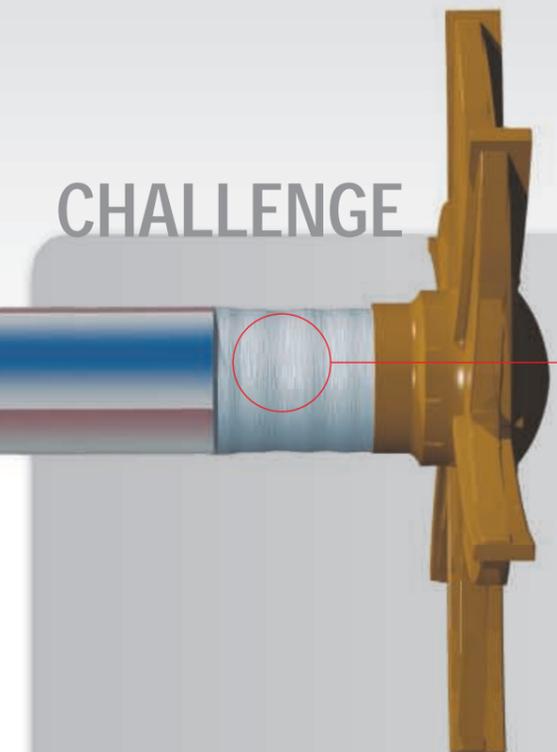
RESULTS

- 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





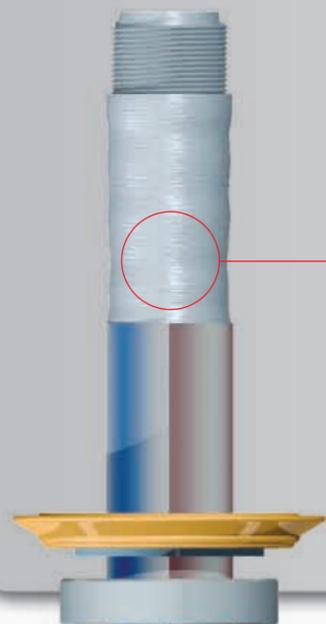
CHALLENGE



Restore worn shaft to the original condition

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 to cause severe wear to the shaft



SOLUTION

Rebuild shafts with Loctite® 3478 Superior Metal

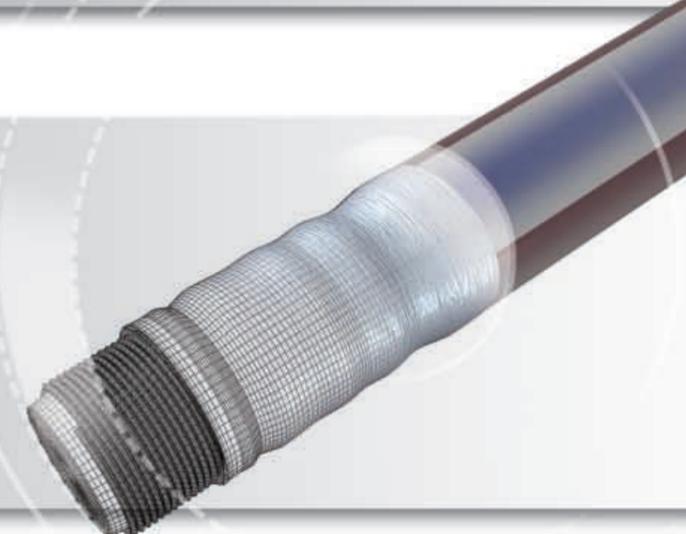
- Loctite® 3478 Superior Metal is an epoxy with high compressive strength that will not rust

Steps:

1. To make the repairs, turn the shaft on a lathe and even out the worn areas to at least 0.75 mm (0.03"), leaving a rough surface finish
2. Clean the shaft of any cutting fluids or oils with Loctite® 7063 Cleaner & Degreaser
3. Mix the product as per the package instructions
4. While the shaft is turning on the lathe, apply Loctite® 3478 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





Keyway Wallow

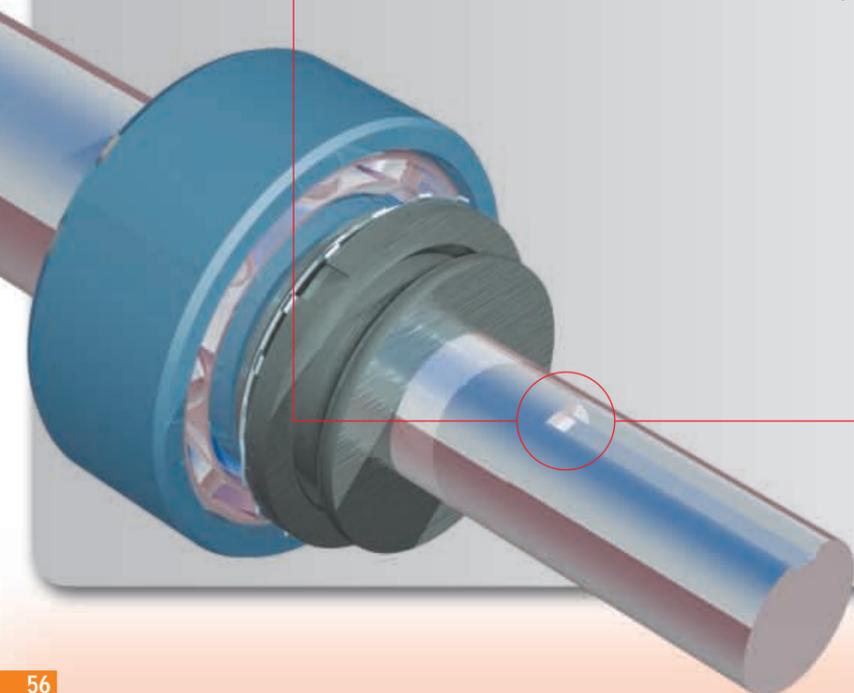
CHALLENGE



Repair wallowed out keyways

Cause:

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



SOLUTION

Apply a bead of Loctite® 660 Quick Metal Retaining Compound directly in the worn keyway

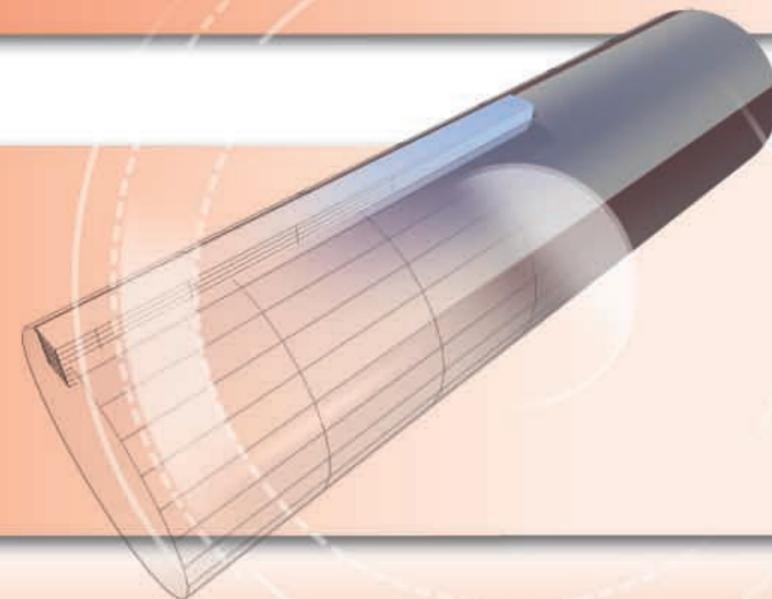
- Loctite® 660 Quick Metal Retaining Compound is a heavy-bodied product designed to fill large voids, up to 0.25 mm (0.01"). For voids bigger than 0.25 mm (0.01") use Loctite® 3478 Superior Metal

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





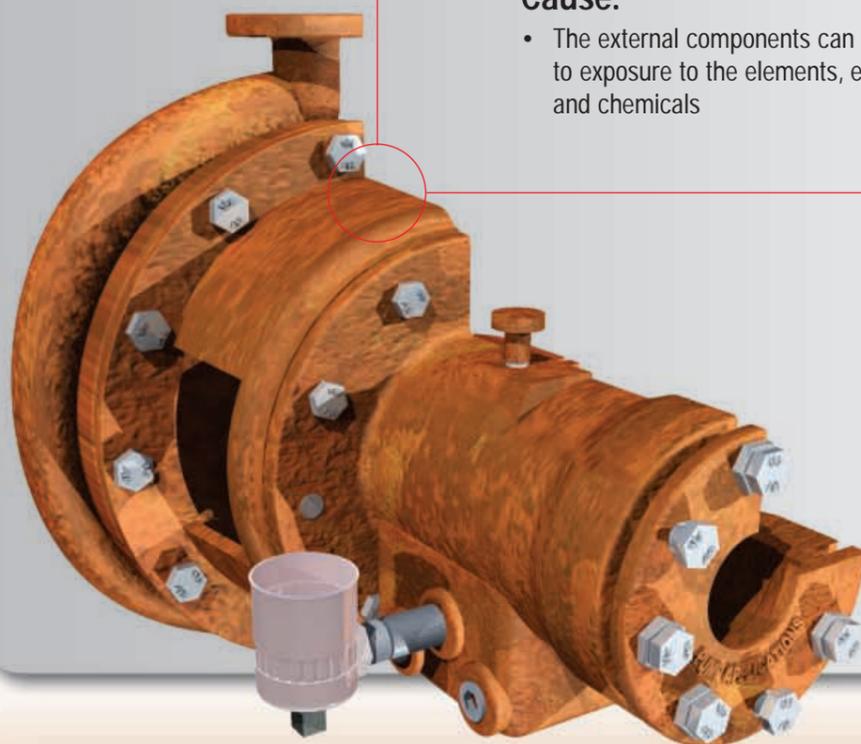
CHALLENGE



Prevent corrosion damage to external parts

Cause:

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



SOLUTION

Loctite® Nordbak® 7221 Chemical Resistant Coating

- Originally developed to protect mining equipment from sulfuric acid
- Provides an excellent coating to protect pump parts from a variety of severe chemical environments

Steps:

1. Remove visible and invisible contaminants. Clean with Loctite® 7063 Cleaner & Degreaser
2. Abrasive blast the surface to a near white metal finish. Remove dust. Clean with Loctite® 7063 Cleaner & Degreaser
3. Mix and apply Loctite® Nordbak® 7221 Chemical Resistant Coating as per the package instructions, min 0.5 mm thick, using two coats. Apply second coat when gel time of first coat is reached

RESULTS

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





PUMP ASSEMBLY

APPLICATIONS	LOCTITE® SOLUTIONS	BENEFITS	PACK SIZE	IDH NO.	PAGE
BEARING FRAME AND HOUSING					
Threaded fittings	Loctite® 577 Thread Sealant	Controlled strength	50 ml	229342	8
	Loctite® 572 Thread Sealant (excl. high temp resist)	Solvent resistant	50 ml	229360	
	Loctite® 561 Pipe Sealant	Semi-solid, controlled strength	19 g stick	TBC	
Oil seals	Loctite® 243 Threadlocker	Medium strength, oil resistant, primerless	50 ml	135278	10
	Loctite® 248 Medium Strength Threadlocker	Semi-solid, medium strength	19 g stick	TBC	
O-rings	Loctite® 8104 Food Grade Grease	NLGI 2, NSF H1	400 ml		12
	Loctite® 8104 Food Grade Silicone Grease	NLGI 2, GC-LB, NSF H1, Synthetic PAO	6 x 1 l	142550	
Power end bolts	Loctite® 8008 C5-A® Copper Based Anti-Seize	General purpose, up to 980 °C	454 g	503147	14
	Loctite® 8014 Food Grade Anti-Seize	NSF approved, up to 400 °C	907 g	505467	
	Loctite® 8009 Heavy Duty Anti-Seize	Metal-free, high lubricity	454 g	504219	
	Loctite® 8023 Marine Grade Anti-Seize	Metal-free, water washout resistance	454 g	504618	
	Loctite® 8013 N-7000 High Purity Anti-Seize	Metal-free, power plant safe	454 g	504588	
	Loctite® 8065 C5-A® Copper Anti-Seize	Semi-solid, general purpose	20 g stick	525380	
	Loctite® 8060 Aluminium Anti-Seize	Semi-solid, general purpose	20 g stick	525113	
	Loctite® 8150 Aluminium Anti-Seize	General purpose, up to 900 °C	500 g	303147	
	Loctite® 8151 Aluminium Anti-Seize	General purpose, up to 900 °C	400 ml	303136	
	Power end bolts	Loctite® 641 Retaining Compound	Press & slip fit, low strength, oil tolerant, general purpose	50 ml	
Loctite® 620 Retaining Compound		Slip fit, high temperature			
Loctite® 668 Retaining Compound		Semi-solid, slip fit, high temperature	19 g stick		
Loctite® 603 Retaining Compound		Press fit, oil tolerant	50 ml	135280	
FRAME ADAPTER					
Oil seals	Loctite® 243 Threadlocker	Medium strength, oil resistant, primerless	50 ml	135278	18
	Loctite® 248 Medium Strength Threadlocker	Semi-solid, medium strength	19 g stick	TBC	
Dowel pins	Loctite® 8008 C5-A® Copper Based Anti-Seize	General purpose, up to 980 °C	454 g	503147	20
	Loctite® 8014 Food Grade Anti-Seize	NSF approved, up to 400 °C	907 g	505467	
	Loctite® 8009 Heavy Duty Anti-Seize	Metal-free, high lubricity	454 g	504219	
	Loctite® 8023 Marine Grade Anti-Seize	Metal-free, water washout resistance	454 g	504618	
	Loctite® 8013 N-7000 High Purity Anti-Seize	Metal-free, power plant safe	454 g	504588	
	Loctite® 8065 C5-A® Copper Anti-Seize	Semi-solid, general purpose	20 g stick	525380	
	Loctite® 8060 Aluminium Anti-Seize	Semi-solid, general purpose	20 g stick	525113	
	Loctite® 8150 Aluminium Anti-Seize	General purpose, up to 900 °C	500 g	303147	
	Loctite® 8151 Aluminium Anti-Seize	General purpose, up to 900 °C	400 ml	303136	
	Gasketing	Loctite® 518 Flange Sealant	General purpose, up to 0.25 mm	65 ml	
Loctite® 574 Flange Sealant		Fast curing, up to 0.25 mm	50 ml	267437	
Loctite® 5910 Quick Gasket		High adhesion, greater than 0.25 mm	300 ml	142491	
Loctite® 548 Gasket Eliminator®		Semi-solid	19 g stick		
Loctite® 5922 Flange Sealant		Increases the reliability of cut gasket seals			

APPLICATIONS	LOCTITE® SOLUTIONS	BENEFITS	PACK SIZE	IDH NO.	PAGE
FRAME ADAPTER					
Adapter bolts	Loctite® 243 Threadlocker	Medium strength, oil resistant, primerless	50 ml	135278	24
	Loctite® 8023 Marine Grade Anti-Seize	Metal-free, water washout resistance	454 g	504618	
	Loctite® 248 Medium Strength Threadlocker	Semi-solid, medium strength	19 g stick	TBC	
GLAND ASSEMBLY					
Packaging gland nuts	Loctite® 8008 C5-A® Copper Based Anti-Seize	General purpose, up to 980 °C	454 g	503147	26
	Loctite® 8014 Food Grade Anti-Seize	NSF approved, up to 400 °C	907 g	505467	
	Loctite® 8009 Heavy Duty Anti-Seize	Metal-free, high lubricity	454 g	504219	
	Loctite® 8023 Marine Grade Anti-Seize	Metal-free, water washout resistance	454 g	504618	
	Loctite® 8013 N-7000 High Purity Anti-Seize	Metal-free, power plant safe	454 g	504588	
	Loctite® 8065 C5-A® Copper Anti-Seize	Semi-solid, general purpose	20 g stick	525380	
	Loctite® 8060 Aluminium Anti-Seize	Semi-solid, general purpose	20 g stick	525113	
	Loctite® 8150 Aluminium Anti-Seize	General purpose, up to 900 °C	500 g	303147	
	Loctite® 8151 Aluminium Anti-Seize	General purpose, up to 900 °C	400 ml	303136	
	Packaging gland studs	Loctite® 243 Threadlocker	Medium strength, oil resistant, primerless	50 ml	
Loctite® 262 Threadlocker		Medium to high strength			
Loctite® 2701 Threadlocker		High strength, primerless	50 ml	234853	
Loctite® 8023 Marine Grade Anti-Seize		Metal-free, water washout resistance	454 g	504618	
Loctite® 248 Medium Strength Threadlocker		Semi-solid, medium strength	19 g stick	TBC	
Flushing connectors	Loctite® 577 Thread Sealant	Controlled strength	50 ml	229342	30
	Loctite® 572 Thread Sealant (excl. high temp resist)	High temperature, solvent resistant	50 ml	229360	
	Loctite® 561 Pipe Sealant	Semi-solid, controlled strength	19 g stick	TBC	
PUMP CASING					
Stuffing box	Loctite® 8008 C5-A® Copper Based Anti-Seize	General purpose, up to 980 °C	454 g	503147	32
	Loctite® 8014 Food Grade Anti-Seize	NSF approved, up to 400 °C	907 g	505467	
	Loctite® 8009 Heavy Duty Anti-Seize	Metal-free, high lubricity	454 g	504219	
	Loctite® 8023 Marine Grade Anti-Seize	Metal-free, water washout resistance	454 g	504618	
	Loctite® 8013 N-7000 High Purity Anti-Seize	Metal-free, power plant safe	454 g	504588	
Stuffing box	Loctite® 8065 C5-A® Copper Anti-Seize	Semi-solid, general purpose	20 g stick	525380	32
	Loctite® 8060 Aluminium Anti-Seize	Semi-solid, general purpose	20 g stick	525113	
	Loctite® 8150 Aluminium Anti-Seize	General purpose, up to 900 °C	500 g	303147	
	Loctite® 8151 Aluminium Anti-Seize	General purpose, up to 900 °C	400 ml	303136	
Gasketing	Loctite® 518 Flange Sealant	General purpose, up to 0.25 mm	65 ml	135480	34
	Loctite® 574 Flange Sealant	Fast curing, up to 0.25 mm	50 ml	267437	
	Loctite® 548 Gasket Eliminator® Loctite® 5922 Flange Sealant	Semi-solid Increases the reliability of cut gasket seals	19 g stick		
Casing bolts	Loctite® 243 Threadlocker	Medium strength, oil resistant, primerless	50 ml	135278	37
	Loctite® 8023 Marine Grade Anti-Seize	Metal-free, water washout resistance	454 g	504618	
	Loctite® 248 Medium Strength Threadlocker	Semi-solid, medium strength	19 g stick	TBC	



Products Table

PUMP ASSEMBLY

APPLICATIONS	LOCTITE® SOLUTIONS	BENEFITS	PACK SIZE	IDH NO.	PAGE
IMPELLER					
Shaft & impeller threads	Loctite® 8008 C5-A® Copper Based Anti-Seize	General purpose, up to 980 °C	454 g	503147	38
	Loctite® 8014 Food Grade Anti-Seize	NSF approved, up to 400 °C	907 g	505467	
	Loctite® 8009 Heavy Duty Anti-Seize	Metal-free, high lubricity	454 g	504219	
	Loctite® 8023 Marine Grade Anti-Seize	Metal-free, water washout resistance	454 g	504618	
	Loctite® 8013 N-7000 High Purity Anti-Seize	Metal-free, power plant safe	454 g	504588	
	Loctite® 8065 C5-A® Copper Anti-Seize	Semi-solid, general purpose	20 g stick	525380	
	Loctite® 8060 Aluminium Anti-Seize	Semi-solid, general purpose	20 g stick	525113	
	Loctite® 8150 Aluminium Anti-Seize	General purpose, up to 900 °C	500 g	303147	
Loctite® 8151 Aluminium Anti-Seize	General purpose, up to 900 °C	400 ml	303136		
KEYWAYS / KEY STOCK					
Prevent keyway wallow	Loctite® 243 Threadlocker	Medium strength, oil resistant, primerless	50 ml	135278	40
	Loctite® 660 Quick Metal Retaining Compound	Press fit repair	12 x 50 ml	229232	
	Loctite® 248 Medium Strength Threadlocker	Semi-solid, medium strength	19 g stick	TBC	
COUPLING					
Coupling	Loctite® 222 Threadlocker	Low strength, small screws	50 ml	231501	44
	Loctite® 243 Threadlocker	Medium strength, oil resistant, primerless	50 ml	135278	
	Loctite® 248 Medium Strength Threadlocker	Semi-solid, medium strength	19 g stick	TBC	
PUMP BASE MOUNTING					
Mounting bolts	Loctite® 262 Threadlocker	Medium to high strength			46
	Loctite® 2701 Threadlocker	High strength, primerless	50 ml	234853	
	Loctite® 290 Threadlocker	Wicking for post-assembly	50 ml	233733	
	Loctite® 268 High Strength Threadlocker	Semi-solid, high strength	19 g stick	TBC	

OTHER PRODUCTS

Adhesives	Loctite® 330 Multi-Bond®	General purpose, no mix adhesive	50/18 ml	230054
	Loctite® 3450	Premeasured epoxy mixer cups	2 x 25 ml	229177
	Loctite® 3430	Fast curing, high strength	2 x 24 ml	142517
Cleaners	Loctite® 7200 Gasket Remover	Aggressive gasket remover	400 ml	458654
	Loctite® 7850 Hand Cleaner	Pre-moistened hand cleaning wipes	12 x 400 ml	234228
	Loctite® 7840 Biodegradable Cleaner & Degreaser	General purpose, environmentally friendly	12 x 750 ml	235330
	Loctite® 7063 Cleaner & Degreaser	General purpose cleaner	400 ml	458648
Penetrants/ Lubricants	Loctite® 8201 Five Way Spray	Moisture displacer & rust preventer	12 x 400 ml	142730
	Loctite® 8040	Frees rusted parts		
	Loctite® 8106 Multi Purpose Grease	General purpose lubricating paste	400 ml	
Primer	Loctite® 7649 Primer	Anaerobic primer/cleaner		

PUMP REPAIR

APPLICATIONS	LOCTITE® SOLUTIONS	BENEFITS	PACK SIZE	IDH NO.	PAGE
OIL SEEPAGE					
Porosity sealing	Loctite® Nordbak® 7221 Chemical Resistant Coating	Protection against chemical attack	5.4 kg	233733	48
	Loctite® 290 Threadlocker	Wicking for post-assembly	50 ml		
CASING / IMPELLER WEAR					
Wear	Loctite® 3478 Superior Metal	Ferro-silicon filled repair epoxy		255891	50
	Loctite® 7222 Wear Resistant Putty	Ceramic fiber filled epoxy	1.3 kg		
	Loctite® Nordbak® 7218 Wearing Compound	Trowelable, large ceramic beads	1 kg		
	Loctite® Nordbak® 7219 High Impact Wearing Compound	Wear and impact resistant	1 kg		
	Loctite® Nordbak® 7221 Chemical Resistant Coating	Protection against chemical attack	5.4 kg		
	Loctite® Nordbak® 7226 Pneu-Wear	Fine particle wear up to 120 °C	1 kg		
	Loctite® Nordbak® 7227 Brushable Ceramic Grey	Smooth, corrosion resistant coating	1 kg		
	Loctite® Nordbak® 7228 Brushable Ceramic White	Smooth, corrosion resistant coating	1 kg		
	Loctite® Nordbak® 7229 High Temperature Pneu-Wear	Protection up to 230 °C	1 kg		
	Loctite® Nordbak® 7230 High Temperature Wearing Compound	Protection up to 230 °C	10 kg		
Loctite® Nordbak® 7234 High Temperature Brushable Ceramic	Protection up to 205 °C	1 kg	254469		
SHAFT WEAR					
Wear	Loctite® 3478 Superior Metal	Ferro-silicon filled repair epoxy		229176	54
	Loctite® Hysol® 3471	Steel-filled repair epoxy	500 g		
KEYWAY WALLOW					
Wallow	Loctite® 660 Quick Metal Retaining Compound	Press fit repair	12 x 50 ml	229232	56
CORROSION					
Corrosion	Loctite® Nordbak® 7221 Chemical Resistant Coating	Protection against chemical attack	5.4 kg		58



The data contained herein are intended as reference only. Please contact your local Henkel Technical Support Group for assistance and recommendation on specifications for these products.

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