This guide has been designed to provide quick and easy assistance to the professionals responsible for the maintenance and repair of shaft assemblies. With the help of this guide, you can:

- Easily select the right way to repair the wide variety of shaft assemblies
- Pinpoint the most suitable repair method for worn parts, or prevent wear proactively
- Determine the best product for your particular maintenance or repair problem

Most shaft assemblies are incorporated into systems carrying a significant capital equipment value. It is therefore vital to maximise their useful lives and ensure reliable performance. Proactive maintenance can minimise expensive downtime, enhance reliability and dramatically cut costs.

A comprehensive range of Loctite® products provides the busy maintenance engineer with all the technologies required to

- Prevent common failures and extend end-product life
- Allow for the recycling of parts to avoid scrap and replacement costs
- Assist in disassembly
- Help ensure reliability and smooth running by restoring performance to "as new" condition.

SHAFT DESIGN AND FUNCTIONS

The Shaft Repair Guide deals with typical shaft-mounted assemblies as well as roller and idler shaft configurations. The sections cover key assemblies, spline and toothed shafts, cylindrical and cone joints. They include tensioning element and clamp connections as well as key, pin or bolt connections used to attach parts and align components along a shaft.

SHAFT REPAIR AND PROACTIVE MAINTENANCE

Harsh environments and operating parameters may result in wear, erosion, corrosion, etc. The Guide describes how to repair worn components or prevent wear proactively.

Different repair methods, colour-coded in the Shaft Repair Guide for easier reference, are available depending on the type and degree of wear:

- **Sleeving** to instantly restore a worn or damaged shaft or create a high quality seal surface
- **Bonding** to fill the gap with repair adhesive without compromising load-bearing capacity
- **Rebuilding** of badly worn shafts with metal filled epoxy

PROFIT FROM RELIABILITY

Reliability and maintenance is a growing concern for companies. At Henkel, we understand the problems you face in ensuring reliability, safety and durability. We provide products for cost-efficient, easy and effective shaft maintenance and repair.

Contact your local Henkel representative for help to meet your specific product application needs.
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</table>
Shaft Repair Program

**Sleeving:**
- Loctite® 603, 648 and 668 Retaining Compounds:
  - For badly worn shafts
  - High load applications
  - Use a sleeve material similar to the original shaft material

**Rebuilding:**
- Loctite® Hysol® 3478 A&B Metal filled Epoxy:
  - Rebuilding the worn surface with metal filled epoxy
  - Machine the shaft after repair to the original (nominal) diameter
- Loctite® 660 Retaining Compound and Loctite® 7649 Activator:
  - Bonding of the shaft mounted component onto the worn surface

**Bonding:**
- Loctite® 603, 648, 660 Retaining Compound and Loctite® Hysol® 9466 A&B Epoxy:
  - Recover worn or incorrectly machined components by using repair adhesives
  - Adhesive selection depends on depth of wear

**Additional Products:**
- Loctite® 7063 Cleaner & Degreaser:
  - Use for all repair methods, for cleaning parts prior to adhesive bonding
- Loctite® 7649 Activator:
  - Use in combination with Retaining Compound
  - Increases cure speed on passive surfaces such as stainless steel, aluminium, and plated or passivated metals
- Loctite® 8192 Dry Film Lubricant Release Agent:
  - Use as a release agent for the repair methods on parallel keys and splines

**Proactive Maintenance:**
- Loctite® 243 and 248 Threadlockers:
  - Stop threads working loose
  - Eliminate the micro-movement which leads to fretting
  - Prevent keyway wear
  - Prevent corrosion
- Loctite® 8012 Moly Paste:
  - Prevention of wear caused by friction
  - Prevention of corrosion

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  - Prevent keyway wear
  - Prevent corrosion
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  - Prevention of wear caused by friction
  - Prevention of corrosion
**Repair Adhesive & Compounds**

**Anaerobic**
- **Material:** Metals, All Materials
- **Repair Components:**
  - Repair of Shaft: Parallel Key, Spline and Teeth
  - Shaft: Cylindrical Fit
  - Cylindrical Fit, Cone Fit, Tapering Element, Clamp Connection
- **Application:** Bonding, Staining, Refurbishing

**Epoxy**
- **Material:** Metals
- **Repair Components:**
  - Repair of Shaft: Parallel Key, Spline and Teeth
  - Shaft: Cylindrical Fit
  - Cylindrical Fit, Cone Fit, Tapering Element, Clamp Connection
- **Application:** Bonding

**Metal filled Epoxy**
- **Material:** Metals
- **Repair Components:**
  - Repair of Shaft: Parallel Key, Spline and Teeth
  - Shaft: Cylindrical Fit
  - Cylindrical Fit, Cone Fit, Tapering Element, Clamp Connection
- **Application:** Bonding, Staining, Refurbishing, Refurbishing

**Wearing Compounds**
- **Metal:** Plastics and Elastomers
- **Product:** Instant Bonding
- **Application:** For bonding metal to metal and metal to rubber
- **Characteristic:** Toughened grade, extended working life, excellent humidity resistance, high wear resistant, anti-seize

**Instant Bonding**
- **Metal:** Metals
- **Product:** Anti-Seize
- **Application:** Anti-Seize for parts under static stress and slow turning and moving components

**Anti-Seize**
- **Metal:** Metals
- **Product:** Anti-Seize
- **Application:** Anti-Seize for parts under static stress and slow turning and moving components

**Additional Products**
- **Cleaning:** For cleaning and degreasing
- **Surface Preparation:** To improve adhesion and reduce wear
- **Lubrication:** To prevent seizing and galling

---

<table>
<thead>
<tr>
<th>Adhesive Number</th>
<th>Product</th>
<th>Application</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Loctite® 600</strong></td>
<td>G1 Instant Hasting Adhesive</td>
<td>Fit: Press fit and cameo transition fit</td>
<td>Steel putty; low shrinkage on cure (0.1%), temperature resistance: 120°C</td>
</tr>
<tr>
<td><strong>Loctite® 601</strong></td>
<td>High Temperature Fastening Adhesive for large work pieces</td>
<td>Fit: Screw fit up to clearance fit; temperature: 200°C (silver lead content)</td>
<td>Steel putty; low shrinkage on cure (0.1%), temperature resistance: 120°C</td>
</tr>
<tr>
<td><strong>Loctite® 602</strong></td>
<td>Special Retaining Adhesive for large gaps</td>
<td>Fit: Press fit up to large clearance fit</td>
<td>Steel putty; low shrinkage on cure (0.1%), temperature resistance: 120°C</td>
</tr>
<tr>
<td><strong>Loctite® 603</strong></td>
<td>Special Retaining Adhesive for large gaps (silver lead)</td>
<td>Fit: Press fit up to large clearance fit</td>
<td>Steel putty; low shrinkage on cure (0.1%), temperature resistance: 120°C</td>
</tr>
<tr>
<td><strong>Loctite® 604</strong></td>
<td>Possibility for disassembly</td>
<td>Fit: Marine clearance fit up to 0.5 mm gap; temperature: 150°C</td>
<td>Aluminum oxide filled, ultra smooth finish, temperature: 230°C (heat cured)</td>
</tr>
<tr>
<td><strong>Loctite® 605</strong></td>
<td>Universal Instant Hasting Adhesive</td>
<td>Fit: Press fit through large clearance fit</td>
<td>Zero Silicon Putty; high bond silicon content, excellent corrosion resistance, and chemicals (25°C)</td>
</tr>
<tr>
<td><strong>Loctite® 606</strong></td>
<td>Quick Metal for large gaps</td>
<td>Fit: Large clearance fit up to 0.25 mm gap</td>
<td>Aluminum oxide filled, low shrinkage on cure (0.1%), temperature resistance: 120°C</td>
</tr>
<tr>
<td><strong>Loctite® 607</strong></td>
<td>Medium Strength Fastening Stick</td>
<td>Fit: Up to 0.15 mm gap; temperature: 150°C</td>
<td>Aluminum oxide filled, low shrinkage on cure (0.1%), temperature resistance: 120°C</td>
</tr>
<tr>
<td><strong>Loctite® 608</strong></td>
<td>Medium Strength Threadblocker</td>
<td>Pressed keep securing the key in the gap</td>
<td>Aluminum oxide filled, low shrinkage on cure (0.1%), temperature resistance: 120°C</td>
</tr>
<tr>
<td><strong>Loctite® 609</strong></td>
<td>Medium Strength Threadblocker</td>
<td>Pressed keep securing the key in the gap</td>
<td>Aluminum oxide filled, low shrinkage on cure (0.1%), temperature resistance: 120°C</td>
</tr>
<tr>
<td><strong>Loctite® 610</strong></td>
<td>Dry Film Lubricant Release Agent</td>
<td>Using as release agent (form grade E500R, E500C coating)</td>
<td>Metal based stainless steel and aluminum release agent, suitable for all metals up to 150°C (115°C)</td>
</tr>
</tbody>
</table>
### Parallel Key

**Challenge**

Shaft mounted component: e.g. Gear Wheel or Pulley
- Step key and keyway wear
- Repair worn keys
- Protection of new and reclaimed components against wear, abrasion and chemical attack

**Note:**
The following procedures can be used in a similar way on all types of key systems, but the repair method is explained for parallel keys. Example for other keys which can be repaired are:
- Woodruff keys
- Gib head keys
- Taper keys

**Cause:**
- Out of tolerance machining results in loose components; this leads to micro-movement and wear
- Alternating loads
- Worst case combined loading
- Damage during assembly
- Incorrect assembly due to contamination of the parts
- Incorrect specified keyway assembly – producing overload during operation

### Solution

Depending on the extent of the wear, the following adhesives are recommended

<table>
<thead>
<tr>
<th>Solution</th>
<th>Repair Method</th>
<th>Adhesive Group</th>
<th>Repair Adhesive</th>
<th>Kind of Fit: Repair Gap/ Bonding Gap:</th>
<th>Curing time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Alignment of parallel key (Worn shaft keyway)</td>
<td>Anaerobic Adhesive</td>
<td>Loctite® 648</td>
<td>Transition/ Clearance Fit</td>
<td>Badly worn keyway</td>
</tr>
<tr>
<td>2.</td>
<td>New parallel keyway (Worn keyway at shaft and collar)</td>
<td>Metal filled Epoxy</td>
<td>Loctite® Hyssol® 3478 A&amp;B</td>
<td>Transition/ Clearance Fit</td>
<td>Badly worn keyway</td>
</tr>
<tr>
<td>3.</td>
<td>Bonding (Worn shaft keyway)</td>
<td>Anaerobic Adhesive and Activator</td>
<td>Loctite® 680 + Loctite® 7649</td>
<td>Medium Gap</td>
<td>&lt; 0.25 mm</td>
</tr>
<tr>
<td>4.</td>
<td>Bonding (Worn shaft keyway)</td>
<td>Epoxy and Release Agent</td>
<td>Loctite® Hyssol® 9466 A&amp;B</td>
<td>Medium Gap</td>
<td>&gt; 0.2 mm – 0.5 mm</td>
</tr>
<tr>
<td>5.</td>
<td>Rebuilding (Worn shaft keyway)</td>
<td>Metal filled Epoxy and Release Agent</td>
<td>Loctite® Hyssol® 3478 A&amp;B</td>
<td>Large Gap</td>
<td>&gt; 0.5 mm</td>
</tr>
</tbody>
</table>

* Apply heat to the joint under repair for a faster curing time

Note: Refer to Technical Data Sheets for more details.
SOLUTION #2

New keyway in existing shaft and collar

If parts are very badly worn it may be necessary to cut new keyways, in this situation the old keyways can be filled as described below.

Steps:
Worn parallel keyway at shaft and collar

- Disassemble the machine components
- Clean parts with Loctite® 7063 Cleaner and Degreaser
- Apply Loctite® Hysol® 3478 A&B Superior Metal into the keyway of both the shaft and collar. Fill all the available space
- Allow 24 hours curing time
- If a rounded surface is required, machine the cured adhesive to the original dimensions of the shaft and bore of the collar
- Machine a new keyway in the shaft and collar
- Re-clean parts with Loctite® 7063 Cleaner and Degreaser
- Apply several drops of Loctite® 243 Threadlocker directly into the new keyway
- Insert the key into the keyway
- Wipe off any excess adhesive
- Assemble the components
- Allow adhesive to cure

SOLUTION #1

Alignment of parallel key

Steps:
Badly worn parallel key assembly

- Disassemble the machine components
- Select a parallel key of the next larger size
- Mill the worn shaft keyway to the size of the new parallel key
- Machine a step in the new parallel key to fit the original keyway in the female component. Reduce the height of the key to fit the keyway
- Roughen the surface
- Clean parts with Loctite® 7063 Cleaner and Degreaser
- Apply Loctite® 648 to the keyway of the shaft
- Assemble the parallel key into the shaft
- Wipe off excess adhesive
- Where there is a high power application, apply Loctite® 648 on to the whole shaft at the engagement area
- Assemble with the key in place
- Wipe off adhesive excess
- Allow adhesive to cure
**Parallel Key**

**Challenge:**
- Secure the key in the keyway on new equipment
- Prevent micro-movements that lead to wear

**Cause:**
- In a new assembly the fit between the key and the keyway is usually tight. However, over time, wear can cause this fit to loosen – leading to damage to the keyway

**Solution:**
- Apply a Loctite® Medium Strength Threadlocker to the keyway or the key
  - Loctite® Medium Strength Threadlocker is appropriate for the gap fill and provides sufficient strength, however, allows easy removal for servicing
  - If the key needs removal, use a hammer to tap a metal chisel or drift against the key

**Steps:**
1. Clean the keyway and key with Loctite® 7063 Cleaner and Degreaser
2. Apply several drops of Loctite® 243 Threadlocker into the keyway, or Loctite® 248 Threadlocker onto the key
3. Insert the key into the keyway
4. Wipe off any excess adhesive
5. Allow the adhesive to fully cure before putting the equipment back into service

**Results:**
- Eliminate the micro-movements which lead to fretting
- Prevent keyway wear
- Prevent corrosion

---

**Bonding + Rebuilding**

**Steps:**
Select the repair adhesive according to the extent of component wear

- Disassembly of the parallel key assembly is necessary. However, the repair is possible without removal of the shaft
- Prepare the surface by roughening with a file or rotary cutting/grinding tool
- Clean parts with Loctite® 7063 Cleaner and Degreaser
- Apply a thin layer of Loctite® 6192 Dry Film Lubricant to the collar and to any other area where adhesion is not required
- Coated parts should not be disturbed during time, 15 to 30 minutes at room temperature
- Apply the selected repair adhesive using a spatula or putty knife. Use a thin coat on the bottom and a thicker layer on the side walls. This ensures the key will not sit too high in the assembly, and produces a close tolerance fit
- Scrape away excess adhesive from the side of the keyway
- Immediately position the components in order to align the key, shaft and hub
- Allow the adhesive to fully cure before putting the equipment back into service

**Results:**
- The assembly is restored and ready for service without a major overhaul
- The key is secured into the keyway
- Elimination of repeat wear
**Spline and Tooothed Shaft**

**SOLUTION**

Depending on the extent of the wear, the following adhesives are recommended:

<table>
<thead>
<tr>
<th>Solution</th>
<th>Repair Method</th>
<th>Adhesive Group</th>
<th>Repair Adhesive</th>
<th>Kind of Fit: Bonding Gap</th>
<th>Repair Gap/ Curing time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bonding non sliding spline</td>
<td>Anaerobic Adhesive and Activator</td>
<td>Loctite® 680 + Loctite® 7640</td>
<td>Medium Gap</td>
<td>&lt; 0.25 mm</td>
</tr>
<tr>
<td>2.</td>
<td>Bonding non sliding spline</td>
<td>Epoxy</td>
<td>Loctite® Hyso® 9466 A&amp;B</td>
<td>Medium Gap</td>
<td>&gt; 0.2 mm – 0.5 mm</td>
</tr>
<tr>
<td>3.</td>
<td>Rebuilding non sliding spline</td>
<td>Metal filled Epoxy</td>
<td>Loctite® Hyso® 3478 A&amp;B</td>
<td>Large Gap</td>
<td>&gt; 0.5 mm</td>
</tr>
</tbody>
</table>

* Apply heat to the joint under repair for a faster curing time

**Note:** Refer to Technical Data Sheets for more details

---

**CHALLENGE**

Shaft mounted component: e.g. Cardan Joint

With spline and toothed shaft it is necessary to differentiate between fixed and sliding splines. The methods mentioned below describe the repair solution for fixed splines only.

- Stop spline wear and failure
- Reduce downtime
- Eliminate costs of new parts
- Reuse previously worn components

**Cause:**

- Out of tolerance machining of components leads to micro-movement and wear
- Alternating loads
- Worst case combined loading
- Damage during assembly
- Incorrect assembly due to contamination of the parts
- Incorrectly specified spline drive – producing overload during operation
PREVENT WEAR OF SPLINE OR TOOTHED SHAFT PROACTIVELY

**Challenge:**
- Protecting the spline inside of the socket to prevent unnecessary fretting

**Cause:**
- Wear will occur where there is friction and movement in the spline coupling
- Contamination between shaft and socket

**Solution:**
- Use Loctite® 8012 Moly Paste proactively
  - Loctite® 8012 Moly Paste contains 65% molybdenum disulfide for maximum lubricity
  - Moly Paste reduces friction
  - The low and uniform friction coefficient of 0.06 creates reliable assembly conditions

**Steps:**
- Clean mating surface before application
- Coat mating surface Loctite® 8012 Moly Paste
- Assemble parts

**Results:**
- Prevention of wear caused by friction
- Prevention of corrosion

---

**SOLUTION #1, 2, 3**

**Rebuilding**

**Steps:**
Select the repair adhesive according to the extent of component wear
- Disassemble the machine components
- If there is no chamfer on the leading edges of the socket, create one using a file or grinding wheel
- Abrasive blast the surface of the spline/toothed shaft and socket
- Clean parts with Loctite® 7063 Cleaner and Degreaser
- Check the spline area for uniformity. Remove high spots or rough areas by filing or stone sanding. Clean again
- Mix (not for Loctite® 660) and apply the adhesive to the spline shaft. Use a spatula for Loctite® Hysol® 3478 A&B. Do not apply adhesive into the socket.
- Immediately push the spline/toothed shaft into the socket and remove excess adhesive
- Allow the adhesive to cure before putting the equipment back into service

**RESULTS**

Assembly is restored and ready for service without a major overhaul.
Shaft mounted component: e.g. Bearing

- Repair worn cylindrical shaft
- Prevent downtime and scrap costs
- Protection of new components against wear, abrasion and chemical attack

Cause:
- Out of tolerance machining results in loose components; this leads to micro-movement and wear
- Load produces axial forces that are higher than original calculations
- Spun bearing caused by insufficient interference or inappropriate loads
- Use of components in aggressive environments and at elevated operating temperatures

Depending on the extent of the wear, the following adhesives are recommended

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<tr>
<th>Solution</th>
<th>Repair Method</th>
<th>Adhesive Group</th>
<th>Repair Adhesive</th>
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<th>Repair Gap/ Bonding Gap:</th>
<th>Curing time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sleevng</td>
<td>Anaerobic Adhesive</td>
<td>Loctite® 648/668</td>
<td>Press/ Transition Fit</td>
<td>&lt; 0.0 mm (Bonding Gap)</td>
<td>12 hrs*</td>
</tr>
<tr>
<td>2.</td>
<td>Bonding</td>
<td>Anaerobic Adhesive</td>
<td>Loctite® 648/668</td>
<td>Transition Fit up to Small Gap</td>
<td>0.0 – 0.08 mm (Repair Gap)</td>
<td>12 hrs*</td>
</tr>
<tr>
<td>3.</td>
<td>Bonding</td>
<td>Anaerobic Adhesive and Activator</td>
<td>Loctite® 660 + Loctite® 7649</td>
<td>Medium Gap</td>
<td>&gt; 0.05 – 0.25 mm (Repair Gap)</td>
<td>12 hrs*</td>
</tr>
<tr>
<td>4.</td>
<td>Bonding</td>
<td>Epoxy</td>
<td>Loctite® 9466</td>
<td>Medium Gap</td>
<td>&gt; 0.2 – 0.5 mm (Repair Gap)</td>
<td>24 hrs*</td>
</tr>
<tr>
<td>5.</td>
<td>Rebuilding + Bonding</td>
<td>Metal Filled Epoxy</td>
<td>Loctite® Hyssol® 3478 A&amp;B + Loctite® 660</td>
<td>Large Gap</td>
<td>&gt; 0.5 mm (Repair Gap)</td>
<td>24 hrs*</td>
</tr>
</tbody>
</table>

* Apply heat to the joint under repair for a faster curing time.

Note: Refer to Technical Data Sheets for more details.
**SOLUTION #2, 3, 4**

**Cylindrical Joint**

**Bonding**

**Steps:**
Select the repair adhesive according to the extent of component wear

- Clean parts with Loctite® 7063 Cleaner and Degreaser
- Roughen shaft mounted component and shaft with abrasive paper at the bonding area
- Re-clean parts
- Apply a bead of the repair adhesive to the circumference of the shaft at the leading edge of the component
- Assemble shaft mounted component: In some cases, heat should be applied to the transition fit
- Wipe off excess
- Allow adhesive to cure
- Adopt the same procedure for press fit joints between the sleeve and bearing

**SOLUTION #1**

**Sleeving**

**Steps:**
Badly worn shaft and high load application

- Determine appropriate size of a sleeve and manufacture as follows:
  - Create a transition fit joint between shaft and sleeve
  - Ensure the outside diameter is the specified shaft diameter
  - Roughen the surface
- Clean parts with Loctite® 7063 Cleaner and Degreaser
- Apply a bead of Loctite® 648 to the circumference of the shaft at the leading edge of the component to be inserted. Apply the adhesive to both parts of the assembly. In the case of a shrink fit (using thermal energy for assembling) apply the adhesive onto the cold part, coating the complete engagement area
- Assemble sleeve: In some cases, heat should applied to the transition fit
- Wipe off excess
- Allow adhesive to cure
- Adopt the same procedure for press fit joints between the sleeve and bearing
SOLUTION #5

**Rebuilding + Bonding**

**Steps:**

- **Badly worn shaft**
  - Using a lathe, undercut the shaft in the worn area as follows:
    - Shaft diameter: 13 – 25 mm: Desired undercut: 1.5 mm
    - Shaft diameter: 25 – 75 mm: Desired undercut: 3 mm
  - Dovetail the ends of the worn area to lock the application into place. This serves as a guide when repairing
  - Finish undercutting by machining a rough cut surface (e.g. Rz := 100 µm). The larger the shaft diameter, the coarser the cut
  - Clean parts with Loctite® 7063 Cleaner and Degreaser
  - Apply a very thin layer of Loctite® Hyso® 3478 A&B Superior Metal and force it into the rough surface finish. Turn the shaft at a very low speed and continue to apply adhesive by using a putty knife or similar. Build the surface above the final desired level
  - Allow the adhesive to cure for 12 hours at room temperature. If necessary apply dry heat to the repair area to speed the cure
  - Machine the repair to the required dimensions
  - Cut the material with the component dry, using carbide or high speed steel. If polishing is required, use an abrasive paper
  - Retain the joint between the shaft and the shaft mounted component with Loctite® 660 (See solution #3)

**Note:**

The Loctite® 7649 Activator is necessary on the rebuilted surface of the shaft, because of the passive surface

**RESULTS**

- Worn shaft is repaired
- Cylindrical joint is strengthened by using a Loctite® Retaining Compound

Cylindrical Joint

**PREVENT BEARING SPINOUT PROACTIVLY**

**Challenge:**

- Prevent bearing spinout
- Prevent corrosion and component damage
- Salvage worn components

**Cause:**

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

**Solution:**

- Retain joint using Loctite® 648 (universal, high strength) or Loctite® 603 (oil tolerant, high strength) Retaining Compound

**Steps:**

- Clean parts with Loctite® 7063 Cleaner and Degreaser
- Apply a bead of Loctite® 648/603 Retaining Compound to the circumference of the shaft at the leading area of the component
- Press the bearing on to the shaft using normal techniques
- Wipe of excess material

**Results:**

- Shaft and/or bearing housing damage is eliminated
- Micro movement between the bearing and the repair area is eliminated
- Corrosion is stopped because the air space between the bearing and the shaft housing is sealed
SOLUTION

**Taper Joint**

Depending on the extent of the wear, the following adhesives are recommended

<table>
<thead>
<tr>
<th>Solution</th>
<th>Repair Method</th>
<th>Adhesive Group</th>
<th>Repair Adhesive</th>
<th>Kind of Fit: Bonding Gap (Steel)</th>
<th>Repair Gap/ Curing time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sleeving</td>
<td>Anaerobic Adhesive</td>
<td>Loctite® 648</td>
<td>Press/ Transition Fit</td>
<td>&lt; 0.0 mm (Bonding Gap)</td>
</tr>
<tr>
<td>2.</td>
<td>Bonding</td>
<td>Anaerobic Adhesive</td>
<td>Loctite® 648</td>
<td>Press Fit and Transition Fit</td>
<td>&lt; 0.0 mm (Bonding Gap)</td>
</tr>
<tr>
<td>3.</td>
<td>Rebuilding + Bonding</td>
<td>Metal Filled Epoxy</td>
<td>Loctite® Hysol® 3478 A&amp;B + Loctite® 648</td>
<td>Large Gap</td>
<td>&gt; 0.5 mm (Repair Gap)</td>
</tr>
</tbody>
</table>

* Apply heat to the joint under repair for a faster curing time

Note: Refer to Technical Data Sheets for more details

CHALLENGE

**Shaft mounted component: e.g. Gear Wheel**

- Repair worn taper joints
- Prevent downtime and scrap costs
- Protection of new components against wear, abrasion and chemical attack

**Cause:**

- Inaccurate machining of components producing incorrect dimensions – leading to micro-movements
- Dirt between the shaft-mounted component and the shaft
- Use of components in elevated operating temperatures
**SOLUTION #1**

**Sleeving**

**Steps:**
- Badly worn shaft and high load application

- Determine an appropriate size of a sleeve
- Create a press fit joint between shaft and sleeve
- Outside diameter of the sleeve should be the nominal diameter of the original cone
- Roughen the surface
- Clean parts with Loctite® 7063 Cleaner and Degreaser
- Apply a bead of Loctite® 648 to the circumference of shaft at leading edge of component. Apply to both parts of the assembly. In case of a shrink fit (using thermal energy for assembling) apply onto the cold part
- Press fit with heating up the sleeve or without heat, depending on the requirements of the assembly. In general, assembling with thermal energy gives better performance of the cured adhesive
- Wipe off excess
- Allow adhesive to cure
- Use the same procedure for press fit joints between the sleeve and the shaft-mounted component

**Note:** If the gear wheel needs a specified axial position it is recommend that the cone sleeve be machined to the original dimensions after bonding it to the shaft.

---

**SOLUTION #2**

**Bonding**

**Steps:**
- Roughen inside of the sleeve and cone shaft with abrasive paper
- Clean parts with Loctite® 7063 Cleaner and Degreaser
- Apply a bead of Loctite® 648 to the circumference of the shaft at leading edge of component. Apply to both parts of the assembly. In the case of a shrink fit (using thermal energy for assembling) apply onto the cold part
- Press fit with heating up the sleeve or without heat, depending on the requirements of the assembly. In general, assembling with thermal energy gives better performance of the cured adhesive
- Wipe off excess
- Allow adhesive to cure
SOLUTION #3

Rebuilding + Bonding

Steps:

- Using a lathe, undercut the shaft in the worn area as follows:
  - Cone middle diameter: 13 – 25 mm: Desired undercut: 1.5 mm
  - Cone middle diameter: 25 – 75 mm: Desired undercut: 3 mm
- Dovetail the ends of the worn area to lock the application into place. This serves as a guide when repairing
- Finish undercutting by machining a rough cut surface. The larger the shaft diameter, the deeper the threads
- Clean parts with Loctite® 7063 Cleaner and Degreaser
- Apply a very thin layer of Loctite® Hysol® 3478 A&B Superior Metal and force it into the rough surface finish. Turn the shaft at a very low speed and continue to apply adhesive by using a putty knife or similar. Build the surface above the final desired level
- Allow the adhesive to cure for 12 hours at room temperature. If necessary apply dry heat to the repair area to speed the cure
- Machine the repair area to the required dimensions
- Cut the material with the component dry, using carbide or high speed steel. If polishing is required, use an abrasive paper
- For the cone fit between the repaired cone shaft and the cone-mounted component, use Loctite® 648.
  Use procedure of solution #2, see page 29

Note:
The Loctite® 7649 Activator is necessary on the rebuilded surface of the shaft, because of the passive surface.

RESULTS

- Assembly is restored and ready for service without a major overhaul
- Cone joint is strengthened by using a Loctite® adhesive as a Retaining Compound

PREVENT CONE FIT WEARING PROACTIVLY

Use of Loctite® 648 Retainer will proactively prevent wearing of a cone fit. Proceed as described in Solution #2, see page 29.
Shaft mounted component: Tensioning Element & Clamp Connection

- Repair worn shaft with a shaft-mounted tensioning element or clamp connection
- Prevent downtime and scrap costs
- Protection of new components against wear, abrasion and chemical attack

Cause:
- Exceeding the design load of the tension or clamp system
- Incorrect assembly/tightening components
- Contamination between shaft and shaft-mounted component

SOLUTION

Depending on the extent of the wear and the kind of load, the following adhesives are recommended:

<table>
<thead>
<tr>
<th>Solution</th>
<th>Repair Method</th>
<th>Adhesive Group</th>
<th>Repair Adhesive</th>
<th>Kind of Fit:</th>
<th>Repair Gap/ Bonding Gap:</th>
<th>Curing time (Steel):</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sleeving: Heavily loaded assemblies</td>
<td>Anaerobic Adhesive</td>
<td>Loctite® 648</td>
<td>Press/ Transition Fit</td>
<td>&lt; 0.0 mm (Bonding Gap)</td>
<td>12 hrs*</td>
</tr>
<tr>
<td>2.</td>
<td>Rebuilding: Moderately loaded assemblies</td>
<td>Metal Filled Epoxy</td>
<td>Loctite® Hysol® 3478 A&amp;B</td>
<td>Large Gap</td>
<td>&gt; 0.5 mm (Repair Gap)</td>
<td>24 hrs*</td>
</tr>
</tbody>
</table>

* Apply heat to the joint under repair for a faster curing time
Note: Refer to Technical Data Sheets for more details
SOLUTION #1

Sleeving

Steps:
Badly worn shaft and high load requirement

- Repair steps for sleeving see solution #1 "Cylindrical Joint", page 22

SOLUTION #2

Tensioning Element & Clamp Connection

Rebuilding

Steps:
Badly worn shaft and moderate loading
Rebuild surface of the shaft for a tensioning element

- Repair steps for rebuilding worn surfaces with metal filled epoxy see solution #5 "Cylindrical Joint", page 24

RESULTS

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

Repaired shaft for a tensioning element with a sleeve

Repaired shaft for a clamp connection with a sleeve

Rebuild surface of the shaft for a clamp connection
**CHALLENGE**

<table>
<thead>
<tr>
<th>Keys:</th>
<th>Pin or bolt connection:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Securing a key in the keyway</td>
<td>• Securing the pin or bolt in the pin/bolt connection</td>
</tr>
<tr>
<td>• Protection of new components against wear, abrasion and chemical attack</td>
<td>• Protection of new components against wear, abrasion and chemical attack</td>
</tr>
</tbody>
</table>

**Cause:**

<table>
<thead>
<tr>
<th>Keys:</th>
<th>Pin or bolt connection:</th>
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</thead>
<tbody>
<tr>
<td>• Keys become loose in the keyway over time</td>
<td>• Pins and bolts become loose in the pin or bolt connection</td>
</tr>
</tbody>
</table>

**SOLUTION**

<table>
<thead>
<tr>
<th>Keys &amp; Pin or Bolt Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Keys:</strong></td>
</tr>
<tr>
<td>• Apply a Loctite® Medium Strength Threadlocker to the keyway and then insert the key</td>
</tr>
<tr>
<td><strong>Pin or bolt connection:</strong></td>
</tr>
<tr>
<td>• Apply a Loctite® Medium Strength Threadlocker on to the pin or bolt and then insert into the bore</td>
</tr>
</tbody>
</table>

**RESULTS**

- Prevention of movement and wear
- Prevention of corrosion
- A long life assembly

**CHALLENGE**

<table>
<thead>
<tr>
<th>Keys:</th>
<th>Pin or bolt connection:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Securing the key stock in the keyway proactively</td>
<td>• Securing the pin or bolt in the pin/bolt connection proactively</td>
</tr>
<tr>
<td>• Protection of new components against wear, abrasion and chemical attack</td>
<td>• Protection of new components against wear, abrasion and chemical attack</td>
</tr>
</tbody>
</table>

**Cause:**

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<tbody>
<tr>
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</table>

**SOLUTION**

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</tbody>
</table>

**RESULTS**

- Prevention of movement and wear
- Prevention of corrosion
- A long life assembly

**Table:**

<table>
<thead>
<tr>
<th>Solution</th>
<th>Repair Method</th>
<th>Adhesive Group</th>
<th>Repair Adhesive</th>
<th>Kind of Fit</th>
<th>Bonding Gap</th>
<th>Curing time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Securing the key stock in the keyway proactively</td>
<td>Medium Strength Threadlocker</td>
<td>Loctite® 243</td>
<td>Press/Transition Fit</td>
<td>&lt; 0.0 mm</td>
<td>3 hrs*</td>
</tr>
<tr>
<td>2.</td>
<td>Securing the pin or bolt in the pin/bolt connection proactively</td>
<td>Medium Strength Threadlocker</td>
<td>Loctite® 243</td>
<td>Press/Transition Fit</td>
<td>&lt; 0.0 mm</td>
<td>3 hrs*</td>
</tr>
</tbody>
</table>

* *Apply heat to the joint under repair for a faster curing time. Note: Refer to Technical Data Sheets for more details.
Rollers and idlers subjected to abrasion, corrosion and chemical attack

- Components: Protection against abrasion, corrosion and chemical attack

Cause:
- Pitting caused by chemical attack or corrosion
- Abrasive wear caused by abrasive particles

Other Shafts

Repair minor surface wear. Protect and coat the surface with Loctite Brushable Ceramic or Chemical Resistant Coating. Provides a high gloss, low friction finish.

<table>
<thead>
<tr>
<th>Shaft Function</th>
<th>Repair Method</th>
<th>Adhesive Group</th>
<th>Repair Adhesive</th>
<th>Cleaner</th>
<th>Repair Gap/ Bonding Gap:</th>
<th>Curing time (Steel):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roller, Idler subjected to abrasion and corrosion</td>
<td>Protect with a wear resistant coating</td>
<td>Wearing Compound</td>
<td>Loctite® Nordbak® 7227/2228</td>
<td>Loctite® 7063 Cleaner and Degreaser</td>
<td>Layer thickness of min. 0.5 mm</td>
<td>6 hrs*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Loctite® Nordbak® 7221</td>
<td></td>
<td></td>
<td>16 hrs*</td>
</tr>
</tbody>
</table>

* Apply heat to the joint under repair for a faster curing time

Loctite® Nordbak® 7227 Brushable Ceramic Grey and Loctite® Nordbak® 7228 Brushable Ceramic White are similar products. Layers of different colour allow for easy visual inspection of the coating and wear.

Loctite® Nordbak® 7221 Chemical Resistant Coating provides an excellent coating to protect components from a variety of severe chemical environments.

Refer to the Technical Data Sheet for additional information.
SOLUTION

Steps:

- Remove visible and invisible contaminants by degreasing, steam cleaning or pressure wash. Clean with Loctite® 7063 Cleaner & Degreaser.
- Abrasive blast the surface. A surface roughness (Rz) of 75 µm, and cleanliness standard of SA 2.5 to 3 is ideal.
- Remove dust. Clean with Loctite® 7063 Cleaner & Degreaser.
- Do not contaminate clean surface. Wear gloves.
- Mix products according to the package instructions.

Note: The optimum material and environment temperature is between 20°C and 30°C; below 10°C no application is possible.

- Solution 1: Apply a coat of Loctite® Nordbak® 7228 Brushable Ceramic White. When gel time is reached, mix and apply a second coat of Loctite® Nordbak® 7227 Brushable Ceramic Grey, to a min 0.5 mm final thickness (or higher if necessary). Allow product to cure.

- Solution 2: Apply one coat of Loctite® Nordbak® 7221 Chemical Resistant coating. When gel time is reached, apply a second coat to a min 0.5 mm final thickness (or higher if necessary). Allow product to cure.

Coverage: Loctite® Nordbak® 7221/7227/7228: 1.2 m² @ 0.5 mm Thick per 1 kg.

RESULTS

- Reduced cost by extending the life of the components.
- Rollers and idlers protected from abrasion, corrosion and chemical attack.
# Shaft application product table

## REPAIR ADHESIVE & COMPOUNDS

<table>
<thead>
<tr>
<th>APPLICATIONS</th>
<th>LOCTITE® SOLUTIONS</th>
<th>BENEFITS</th>
<th>COMPOUNDS</th>
<th>MATERIAL</th>
<th>MIN. – MAX. GAP</th>
<th>PACK SIZE</th>
<th>IDH NO.</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonding</td>
<td>Loctite® 648 Retaining Compound</td>
<td>High temperature, high strength</td>
<td>ANAEROBIC RETAINING COMPOUND</td>
<td>Metals</td>
<td>Press fit – 0.08 mm gap</td>
<td>50 ml</td>
<td>234880</td>
<td>10</td>
</tr>
<tr>
<td>Rebuilding</td>
<td>Loctite® Hysol® 3478 A&amp;B Superior Metal</td>
<td>Ferro silicon filled epoxy, with outstanding compressive strength</td>
<td>METAL FILLED EPOXY</td>
<td>Metals</td>
<td>&gt; 0.5 mm gap</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bonding</td>
<td>Loctite® 660 Quick Metal, Retaining Compound</td>
<td>High strength, gap filling up to 0.25 mm</td>
<td>ANAEROBIC RETAINING COMPOUND</td>
<td>Metals</td>
<td>Up to 0.25 mm gap</td>
<td>12 x 50 ml</td>
<td>229232</td>
<td>10</td>
</tr>
<tr>
<td>Bonding</td>
<td>Loctite® Hysol® 9466 A&amp;B Structural Adhesive</td>
<td>Toughened; multi purpose application; long open time; high strength</td>
<td>2K EPOXY</td>
<td>Metals; All Materials</td>
<td>0.2 – 0.5 mm gap</td>
<td>50 ml</td>
<td>451198</td>
<td>10</td>
</tr>
<tr>
<td>Bonding</td>
<td>Loctite® Hysol® 3478 A&amp;B Superior Metal</td>
<td>High strength, gap filling up to 0.25 mm</td>
<td>ANAEROBIC RETAINING COMPOUND</td>
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<td>50 ml</td>
<td>451198</td>
<td>16</td>
</tr>
<tr>
<td>Bonding</td>
<td>Loctite® 603 Retaining Compound</td>
<td>High strength, oil tolerant</td>
<td>ANAEROBIC RETAINING COMPOUND</td>
<td>Metals</td>
<td>Press fit – 0.05 mm gap</td>
<td>12 x 50 ml</td>
<td>135280</td>
<td>20</td>
</tr>
</tbody>
</table>

---

**PARALLEL KEY**

**SPLINE AND TOOTHED SHAFT**

| Bonding non sliding spline | Loctite® 660 Quick Metal, Retaining Compound | High strength, gap filling up to 0.25 mm                              | ANAEROBIC RETAINING COMPOUND   | Metals            | Up to 0.25 mm gap | 12 x 50 ml | 229232 | 16   |
| Bonding non sliding spline | Loctite® Hysol® 9466 A&B Structural Adhesive | Toughened; multi purpose application; long open time; high strength    | 2K EPOXY                       | Metals; All Materials | 0.2 – 0.5 mm gap | 50 ml     | 451198 | 16   |
| Rebuilding non sliding spline | Loctite® Hysol® 3478 A&B Superior Metal | Ferro silicon filled epoxy, with outstanding compressive strength    | METAL FILLED EPOXY             | Metals            | > 0.5 mm gap     |           |        |      |

**CYLINDRICAL JOINT**

<p>| Sleeve + Bonding       | Loctite® 648 Retaining Compound     | High temperature, high strength                                          | ANAEROBIC RETAINING COMPOUND   | Metals            | Press fit – 0.08 mm gap | 50 ml     | 234880 | 20   |
| Bonding               | Loctite® 660 Quick Metal, Retaining Compound | High strength, gap filling up to 0.25 mm                              | ANAEROBIC RETAINING COMPOUND   | Metals            | Up to 0.25 mm gap | 12 x 50 ml | 229232 | 20   |
| Bonding               | Loctite® Hysol® 9466 A&amp;B Structural Adhesive | Toughened; multi purpose application;                                 | 2K EPOXY                       | Metals; All Materials | 0.2 – 0.5 mm gap | 50 ml     | 451198 | 20   |
| Rebuilding            | Loctite® Hysol® 3478 A&amp;B Superior Metal | Ferro silicon filled epoxy, with outstanding compressive strength    | METAL FILLED EPOXY             | Metals            | &gt; 0.5 mm gap     |           |        |      |
| Sleeve + Bonding       | Loctite® 603 Retaining Compound     | High strength, oil tolerant                                              | ANAEROBIC RETAINING COMPOUND   | Metals            | Press fit – 0.05 mm gap | 12 x 50 ml | 135280 | 20   |</p>
<table>
<thead>
<tr>
<th>APPLICATIONS</th>
<th>LOCTITE® SOLUTIONS</th>
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<th>COMPOUNDS</th>
<th>MATERIAL</th>
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<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TAPER JOINT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slewing + Bonding</td>
<td>Loctite® 648 Retaining Compound</td>
<td>High temperature, high strength</td>
<td>ANAEROBIC RETAINING COMPOUND</td>
<td>Metals</td>
<td>Press fit – 0.08 mm</td>
<td>50 ml</td>
<td>234880</td>
<td>26</td>
</tr>
<tr>
<td>Rebuilding</td>
<td>Loctite® Hysol® 3478 A&amp;B Superior Metal</td>
<td>Ferro silicon filled epoxy, with outstanding compressive strength</td>
<td>METAL FILLED EPOXY</td>
<td>Metals</td>
<td>&gt; 0.5 mm gap</td>
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<tr>
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<td>Loctite® 603 Retaining Compound</td>
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<td>26</td>
</tr>
<tr>
<td><strong>TENSIONING ELEMENT &amp; CLAMP CONNECTION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td><strong>KEYS &amp; PIN OR BOLT CONNECTION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Bonding</td>
<td>Loctite® 243 Threadlocker</td>
<td>Medium strength, liquid</td>
<td>ANAEROBIC RETAINING COMPOUND</td>
<td>Metals</td>
<td>Up to 0.05 mm</td>
<td>50 ml</td>
<td>135278</td>
<td>32</td>
</tr>
<tr>
<td><strong>OTHER SHAFTS</strong></td>
<td></td>
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<tr>
<td>Rebuilding a wear resistant coating</td>
<td>Loctite® Nordbak® 7227 Brushable Ceramic Grey</td>
<td>Thin film, temp. resistance: 90°C; ultra smooth</td>
<td>WEARING COMPOUND</td>
<td>Metals</td>
<td>&gt; 0.5 mm (layer)</td>
<td>1 kg</td>
<td>255893</td>
<td>38</td>
</tr>
<tr>
<td>Rebuilding a wear resistant coating</td>
<td>Loctite® Nordbak® 7228 Brushable Ceramic White</td>
<td>Thin film, temp. resistance: 90°C; ultra smooth</td>
<td>WEARING COMPOUND</td>
<td>Metals</td>
<td>&gt; 0.5 mm (layer)</td>
<td>1 kg</td>
<td>255894</td>
<td>38</td>
</tr>
</tbody>
</table>
### Shaft Application Product Table

**Applications**

<table>
<thead>
<tr>
<th>Applications</th>
<th>Loctite® Solutions</th>
<th>Benefits</th>
<th>Pack Size</th>
<th>IDH No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Threadlocker</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Bonding</td>
<td>Loctite® 248 Threadlocker</td>
<td>Medium strength, semi-solid, Stick</td>
<td>19 g stick</td>
<td>540491</td>
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<tr>
<td><strong>Anaerobic Retaining Compound</strong></td>
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<tr>
<td>Sleeve + Bonding</td>
<td>Loctite® 620 Retaining Compound</td>
<td>Medium to high strength; high temperature</td>
<td>250 ml</td>
<td>135515</td>
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<tr>
<td></td>
<td>Loctite® 638 Retaining Compound</td>
<td>High strength</td>
<td>50 ml</td>
<td>234795</td>
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<tr>
<td></td>
<td>Loctite® 640 Retaining Compound</td>
<td>High strength, high temperature; slow cure</td>
<td>250 ml</td>
<td>267441</td>
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<tr>
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<td>Loctite® 641 Retaining Compound</td>
<td>Medium strength; possibility to dismantle</td>
<td>50 ml</td>
<td>135522</td>
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<tr>
<td></td>
<td>Loctite® 688 Retaining Compound</td>
<td>Medium strength; high temperature; Stick</td>
<td>15 g stick</td>
<td>705053</td>
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<tr>
<td><strong>Epoxy</strong></td>
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<tr>
<td>Bonding</td>
<td>Loctite® Hyposet® 3421 A&amp;B Structural Adhesive</td>
<td>2K, General Purpose, medium viscosity, extended working life; humidity resistant</td>
<td>1 kg</td>
<td>431949</td>
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<tr>
<td></td>
<td>Loctite® Hyposet® 3430 A&amp;B Structural Adhesive</td>
<td>2K, fast cure; Five Minute Epoxy; Ultra Clear; General Repair;</td>
<td>1 kg</td>
<td>431948</td>
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<tr>
<td></td>
<td>Loctite® Hyposet® 3450 A&amp;B Structural Adhesive</td>
<td>2K; Fast Cure; Five Minute Epoxy; large gaps; damaged components</td>
<td>50 ml</td>
<td>451277</td>
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<tr>
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<td>Loctite® Hyposet® 9492 A&amp;B Structural Adhesive</td>
<td>2K, High temperature; Multi Purpose</td>
<td>2 x 25 ml</td>
<td>29177</td>
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<td></td>
<td>High strength</td>
<td>50 ml</td>
<td>468286</td>
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<tr>
<td><strong>Metal Filled Epoxy</strong></td>
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<tr>
<td>Rebuilding</td>
<td>Loctite® Hyposet® 3471 A&amp;B Metal Set S1</td>
<td>Steel Putty</td>
<td>500 g</td>
<td>229176</td>
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<tr>
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<td>Loctite® Hyposet® 3472 A&amp;B Metal Set S2</td>
<td>Steel Pourable</td>
<td>500 g</td>
<td>229175</td>
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<td>Loctite® Hyposet® 3473 A&amp;B Metal Set S3</td>
<td>Steel Fast Cure</td>
<td>500 g</td>
<td>229174</td>
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<tr>
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<td>Loctite® Hyposet® 3474 A&amp;B Metal Set M</td>
<td>Metallic parts under friction; wear resistant</td>
<td>500 g</td>
<td>195881</td>
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<tr>
<td></td>
<td>Loctite® Hyposet® 3475 A&amp;B Metal Set AI</td>
<td>Aluminium; Multi Purpose</td>
<td>500 g</td>
<td>29173</td>
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<tr>
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<td>Loctite® Hyposet® 3479 A&amp;B Metal Set HFA</td>
<td>Aluminium, High temperature resistant</td>
<td>500 g</td>
<td>195826</td>
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<tr>
<td><strong>Wearing Compound</strong></td>
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<tr>
<td>Rebuilding a wear resistant coating</td>
<td>Loctite® Nordbak® 7221 Chemical Resistant Coating</td>
<td>Chemical resist</td>
<td>1 kg</td>
<td>254469</td>
</tr>
<tr>
<td></td>
<td>Loctite® Nordbak® 7234 High Temperature Brushable Ceramic</td>
<td>Thin film, temp. resistance: 205°C; grey</td>
<td>1 kg</td>
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<tr>
<td><strong>Instant Bonding</strong></td>
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<tr>
<td>Bonding</td>
<td>Loctite® 401 Instant Adhesive</td>
<td>General Purpose</td>
<td>20 g</td>
<td>135428</td>
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<tr>
<td></td>
<td>Loctite® 454 Instant Adhesive</td>
<td>General Purpose; Gel</td>
<td>20 g</td>
<td>195678</td>
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<tr>
<td></td>
<td>Loctite® 480 Instant Adhesive</td>
<td>Peel resistant; rubber toughened; black</td>
<td>20 g</td>
<td>135250</td>
</tr>
</tbody>
</table>

**Applications**

<table>
<thead>
<tr>
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<th>Pack Size</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Anti-Seize</strong></td>
<td></td>
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<tr>
<td>Avoid Wear</td>
<td>Loctite® 8009 CS-A® Heavy Duty Anti-Seize</td>
<td>Metal-free, high lubricity</td>
<td>454 g</td>
<td>504219</td>
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<tr>
<td>Corrosion and Seizing</td>
<td>Loctite® 8012 Moly Paste</td>
<td>High loads, protection during running</td>
<td>454 g</td>
<td>504236</td>
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<tr>
<td>Lubrication property</td>
<td>Loctite® 8023 Marine Grade Anti-Seize</td>
<td>Wash out resistance, use on stainless steel</td>
<td>454 g</td>
<td>504618</td>
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<tr>
<td></td>
<td>Loctite® 8060 Aluminium Anti-Seize</td>
<td>Semi-solid stick, general purpose</td>
<td>20 g stick</td>
<td>525113</td>
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<tr>
<td></td>
<td>Loctite® 8065 CS-A® Copper Anti-Seize</td>
<td>Semi-solid stick, general purpose</td>
<td>20 g stick</td>
<td>525380</td>
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<tr>
<td></td>
<td>Loctite® 8191 MoS2 Anti-Friction Coating</td>
<td>General purpose, dry film lubricant</td>
<td>400 ml</td>
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<tr>
<td><strong>Cleaning</strong></td>
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<tr>
<td></td>
<td>Loctite® 7063 Cleaner &amp; Degreaser</td>
<td>General parts Cleaner; Aerosol; solvent based</td>
<td>400 ml</td>
<td>88344</td>
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<tr>
<td><strong>Surface Preparation</strong></td>
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<tr>
<td>To improve adhesion</td>
<td>Loctite® 7649 Activator</td>
<td>Solvent based Activator for anaerobic products</td>
<td>150 ml</td>
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<td>Loctite® 7240 Activator</td>
<td>Solvent free Activator for anaerobic products</td>
<td>90 ml</td>
<td>333369</td>
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<td><strong>Lubrication – Oil Dry Film</strong></td>
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<tr>
<td>To prevent seizing and galling</td>
<td>Loctite® 8192 Dry Film Lubricant Release Agent</td>
<td>Dry Film Lubricant Aerosol, Used as a release agent for shaft repair</td>
<td>12 x 400 ml</td>
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</tbody>
</table>