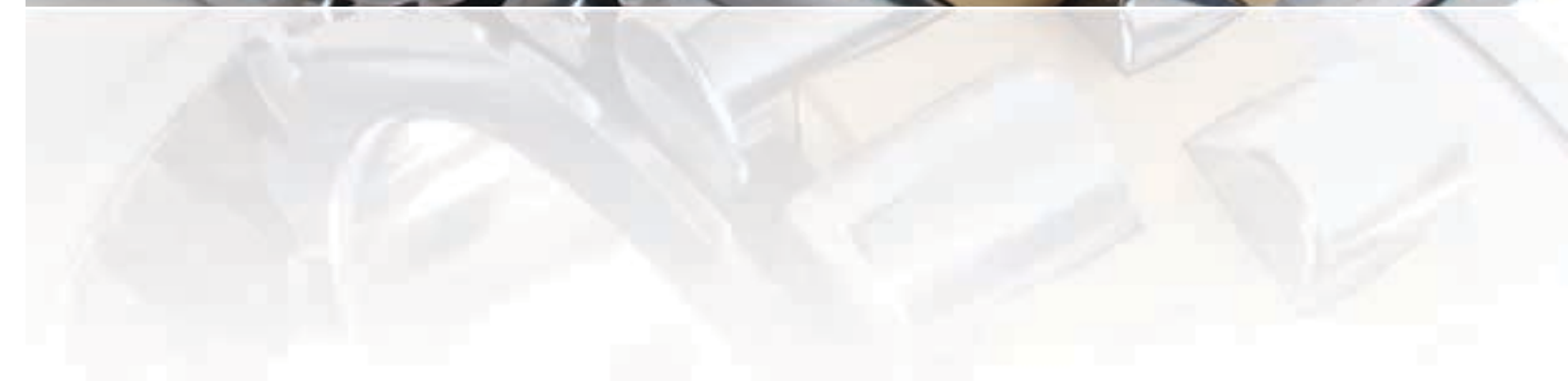


The Value of Bearing Remanufacturing



The Timken Company keeps the world turning, with innovative friction management and power transmission products and services, enabling our customers to perform faster and more efficiently. Timken is Where You Turn™ for better performance.

For more information about Timken industrial services and our bearing remanufacturing solutions, contact your Timken representative or visit www.timken.com/bearingrepair.

TIMKEN
Where You Turn

Bearings • Steel •
Precision Components • Lubrication •
Seals • Remanufacture and Repair •
Industrial Services

www.timken.com

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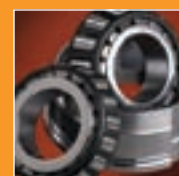
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The Value of Bearing Remanufacturing

Timken's bearing remanufacturing program is designed to provide customers with the best service options available, returning bearings to like-new specifications for less time and money than purchasing new. When viewed as an integral part of your supply chain, bearing remanufacturing can reduce your cost of operation.

- Increase bearing service life up to four times
- Save up to 60 percent off the cost of buying new
- Restore bearings in a fraction of the time required to manufacture new

Remanufacturing is available for any bearing type or brand – even competitor products – and is ideal for paper, metals, mining, power generation, cement and other heavy industrial applications.



Expert Bearing Repair

Experience You Trust

Timken's industrial maintenance services are grounded in our knowledge of motion, friction, lubrication and metallurgy. With more than 100 years of friction management experience, we are uniquely qualified to manage, repair and maintain our customers' power transmission systems.

Global Presence and Quality

With nearly 200 technology, manufacturing, sales and distribution facilities in 27 countries, Timken has a global network and commitment to quality to meet our remanufacturing customers' needs throughout the world. Timken worldwide quality standards are implemented at every plant to ensure global consistency in design and manufacturing.

Integrated Maintenance Solutions

From individual component repair to mill maintenance management programs, turn to Timken® industrial services for your complete maintenance solutions:

- Bearing Repair
- Chock and Housing Maintenance and Repair
- Chock Bearing Maintenance
- Roll Repair and Overlays
- Roll Bearing Maintenance
- New Chock and Roll Manufacturing
- Coupling Repair
- Chock Lok®
- Reliability Solutions
- Combined Mechanical Services
- Mill Maintenance Management
- Inventory Program
- Training



Bearing Repair Solutions

Our experienced Timken representatives will help you to identify the type of bearing damage, determine the root-cause problem and suggest a proper repair solution. Bearings that range in size from 254 to 6096 mm (10 to 240 in.) in O.D. are ideal candidates for remanufacture. It is recommended that bearings smaller than 457 mm (18 in.) in O.D. be grouped into economical quantities.

Depending on the extent of damage, a bearing may be sent to a Timken repair facility. In some instances, onsite repairs are possible. Repair options include:

Recertification

During recertification, bearing assemblies are:

- Cleaned
- Examined
- Measured for verification of internal clearances
- Preserved and packaged

Reclamation

During reclamation, bearing components are:

- Polished using Timken's proprietary vibratory process
- Preserved and packaged

Reconditioning

During reconditioning, bearing assemblies are:

- Cleaned
- Examined
- Components polished
- Measured for verification of internal clearances
- Preserved and packaged

Remanufacture*

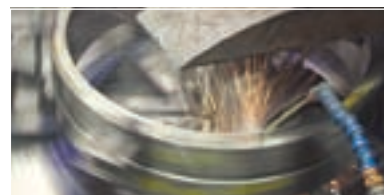
During remanufacturing, bearing assemblies are:

- Cleaned
- Examined
- Raceways reground
- New roller sets manufactured
- Internal clearances reset
- Preserved and packaged

* Major components may be required

Modification

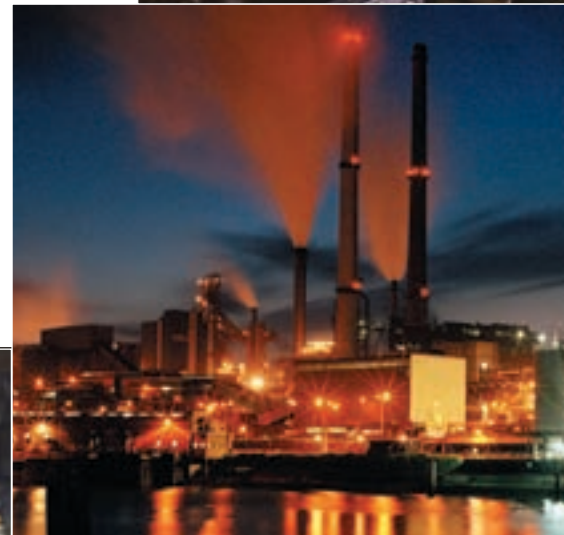
Special features may be added to existing or new bearing assemblies. These features enhance performance, retrofit to special applications, or even upgrade to Timken's most recent product designs.



from the Bearing Experts

Determining if and when a bearing needs to be serviced may require more than a visual inspection. Some of the signs a bearing may need to be repaired are when it:

- Nears a suggested life expectancy
- Exceeds an operating temperature of 93° C (200° F)
- Has been exposed to excessive vibration
- Experienced a sudden drop or gain in lubrication



What type of bearing damage can be repaired?

The following guide outlines common types of bearing damage and Timken repair solutions.

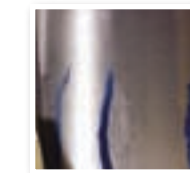


Fretting

Also known as friction oxidation. Typically occurs on the bore, O.D.

and face of the bearing race due to minute movement of these surfaces and the shaft or housing. Red or black oxide of iron is usually evident under close fit conditions.

Repair Solution: Polish

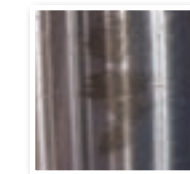


Scuffing

Also known as smearing, scoring or galling. Damage is caused

by metal-to-metal contact, resulting in the removal and transfer of metal from one bearing component to another.

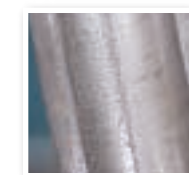
Repair Solution: Clean or Polish



Staining

Appears as surface discoloration without pitting, similar to oil oxidation.

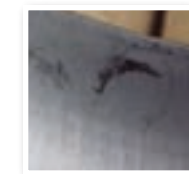
Repair Solution: Clean or Polish



Wear

Occurs when the contact surface has been degraded and worn away by mechanical action while the bearing is in use.

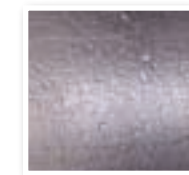
Repair Solution: Regrind



Corrosion/ Etching

Usually caused by moisture or water contamination, this chemical action is in the form of rust, attacking bearing component surfaces.

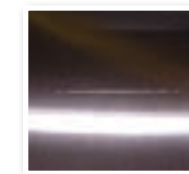
Repair Solution: Regrind



Debris Denting

Localized surface depressions that are caused by debris or foreign materials that travel within the lubricant, through the bearing, and dent internal surfaces.

Repair Solution: Regrind



Brinelling

A permanent deformation of a bearing surface at the roller and raceway contact areas caused by excessive load or impact.

Repair Solution: Regrind

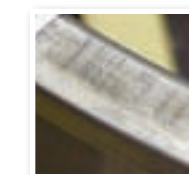


Spalling

Also known as flaking, fine grain or coarse grain spalling. Damage

appears on the bearing raceway or rolling element as metal flakes or scale-like particles.

Repair Solution: Replace Component

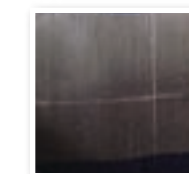


Heat Checks

Surface cracks caused by heat from sliding contact, usually

formed in the direction of motion.

Repair Solution: Replace Component



Crack/Fracture

Appears as a significant visible surface crack that is usually caused

by improper handling or unusual operating conditions.

Repair Solution: Replace Component



Bearing remanufacturing is a green maintenance procedure, requiring minimal energy input and significantly reducing raw material consumption, when compared to manufacturing new bearings.

