Reduce MTTR for increased productivity – and improve worker safety

SKF Cooper split spherical roller bearings

Explore your full potential

SKF Explorer spherical roller bearings
SKF Cooper split spherical roller bearings
SKF Maintenance Products
SKF Machine Health and Remote Diagnostic Service
SKF Split Axial Bearing Units
SKF Split Hydraulic Motor Adapters
SKF Split Hydraulic Motor Adapters
SKF Split Motor Adapters
SKF Maintenance Products
SKF Power Transmission Products
SKF Remanufacturing and Inspecion Service

skf.com

SKF, COOPER and SKF SYSTEM24 are registered trademarks of the SKF Group.

© SKF Group 2019

The contents of this publication are the copyright of the publisher and may not be reproduced (even extracts) unless prior written permission is granted. Every care has been taken to ensure the accuracy of the information contained in this publication but no liability can be accepted for any loss or damage whether direct, indirect or consequential arising out of the use of the information contained herein.

PUB 73/P2 18339 EN

March 2019

Certain image(s) used under license from Shutterstock.com.
Cut downtime to a minimum

Combining more than a century of SKF self-aligning bearing knowledge and more than a century of Cooper split cylindrical roller bearing expertise, SKF Cooper split spherical roller bearings (sealed or open) are designed to be easily replaced in situ and require very few changes to the shaft alignment or driveline – reducing mean time to repair (MTTR) by two-thirds.

Choose sealed or open

MTTR: FROM 24 HOURS TO 8 HOURS*

* In-field reports of bearing changes for mining customers

- Allows safer and time-saving in situ bearing replacements in the trapped position on conveyor pulleys, stacker reclaimers and other machinery
- Sealed variant available for increased protection against contamination and reduced maintenance
- Longer service life (MTBF) compared to other split bearings, thanks to the wire cut inner and outer ring manufacturing technique and sealed versions
- Sealed variant reduces grease consumption – and cuts environmental impact
- Compatible with SKF metric and inch split block housings e.g. SNLD, SMS and SAF / SDAF
- Reduced risk of shaft fretting with better axial clamping
- Interchangeable with competitors’ split spherical roller bearings and split block housings

Decrease your:
- MTTR
- Worker exposure to accidents
- Contaminant ingress

Increase your:
- Productivity
- Bearing reliability
- Machine performance

Choose sealed or open

\begin{itemize}
  \item Allows safer and time-saving in situ bearing replacements in the trapped position on conveyor pulleys, stacker reclaimers and other machinery
  \item Sealed variant available for increased protection against contamination and reduced maintenance
  \item Longer service life (MTBF) compared to other split bearings, thanks to the wire cut inner and outer ring manufacturing technique and sealed versions
  \item Sealed variant reduces grease consumption – and cuts environmental impact
  \item Compatible with SKF metric and inch split block housings e.g. SNLD, SMS and SAF / SDAF
  \item Reduced risk of shaft fretting with better axial clamping
  \item Interchangeable with competitors’ split spherical roller bearings and split block housings
\end{itemize}

Cut downtime to a minimum

Choose sealed or open

MTTR: FROM 24 HOURS TO 8 HOURS*

* In-field reports of bearing changes for mining customers

- Allows safer and time-saving in situ bearing replacements in the trapped position on conveyor pulleys, stacker reclaimers and other machinery
- Sealed variant available for increased protection against contamination and reduced maintenance
- Longer service life (MTBF) compared to other split bearings, thanks to the wire cut inner and outer ring manufacturing technique and sealed versions
- Sealed variant reduces grease consumption – and cuts environmental impact
- Compatible with SKF metric and inch split block housings e.g. SNLD, SMS and SAF / SDAF
- Reduced risk of shaft fretting with better axial clamping
- Interchangeable with competitors’ split spherical roller bearings and split block housings

Decrease your:
- MTTR
- Worker exposure to accidents
- Contaminant ingress

Increase your:
- Productivity
- Bearing reliability
- Machine performance

Choose sealed or open

MTTR: FROM 24 HOURS TO 8 HOURS*

* In-field reports of bearing changes for mining customers

- Allows safer and time-saving in situ bearing replacements in the trapped position on conveyor pulleys, stacker reclaimers and other machinery
- Sealed variant available for increased protection against contamination and reduced maintenance
- Longer service life (MTBF) compared to other split bearings, thanks to the wire cut inner and outer ring manufacturing technique and sealed versions
- Sealed variant reduces grease consumption – and cuts environmental impact
- Compatible with SKF metric and inch split block housings e.g. SNLD, SMS and SAF / SDAF
- Reduced risk of shaft fretting with better axial clamping
- Interchangeable with competitors’ split spherical roller bearings and split block housings

Decrease your:
- MTTR
- Worker exposure to accidents
- Contaminant ingress

Increase your:
- Productivity
- Bearing reliability
- Machine performance

Choose sealed or open

MTTR: FROM 24 HOURS TO 8 HOURS*

* In-field reports of bearing changes for mining customers

- Allows safer and time-saving in situ bearing replacements in the trapped position on conveyor pulleys, stacker reclaimers and other machinery
- Sealed variant available for increased protection against contamination and reduced maintenance
- Longer service life (MTBF) compared to other split bearings, thanks to the wire cut inner and outer ring manufacturing technique and sealed versions
- Sealed variant reduces grease consumption – and cuts environmental impact
- Compatible with SKF metric and inch split block housings e.g. SNLD, SMS and SAF / SDAF
- Reduced risk of shaft fretting with better axial clamping
- Interchangeable with competitors’ split spherical roller bearings and split block housings

Decrease your:
- MTTR
- Worker exposure to accidents
- Contaminant ingress

Increase your:
- Productivity
- Bearing reliability
- Machine performance

Choose sealed or open

MTTR: FROM 24 HOURS TO 8 HOURS*

* In-field reports of bearing changes for mining customers

- Allows safer and time-saving in situ bearing replacements in the trapped position on conveyor pulleys, stacker reclaimers and other machinery
- Sealed variant available for increased protection against contamination and reduced maintenance
- Longer service life (MTBF) compared to other split bearings, thanks to the wire cut inner and outer ring manufacturing technique and sealed versions
- Sealed variant reduces grease consumption – and cuts environmental impact
- Compatible with SKF metric and inch split block housings e.g. SNLD, SMS and SAF / SDAF
- Reduced risk of shaft fretting with better axial clamping
- Interchangeable with competitors’ split spherical roller bearings and split block housings

Decrease your:
- MTTR
- Worker exposure to accidents
- Contaminant ingress

Increase your:
- Productivity
- Bearing reliability
- Machine performance

Choose sealed or open

MTTR: FROM 24 HOURS TO 8 HOURS*

* In-field reports of bearing changes for mining customers

- Allows safer and time-saving in situ bearing replacements in the trapped position on conveyor pulleys, stacker reclaimers and other machinery
- Sealed variant available for increased protection against contamination and reduced maintenance
- Longer service life (MTBF) compared to other split bearings, thanks to the wire cut inner and outer ring manufacturing technique and sealed versions
- Sealed variant reduces grease consumption – and cuts environmental impact
- Compatible with SKF metric and inch split block housings e.g. SNLD, SMS and SAF / SDAF
- Reduced risk of shaft fretting with better axial clamping
- Interchangeable with competitors’ split spherical roller bearings and split block housings

Decrease your:
- MTTR
- Worker exposure to accidents
- Contaminant ingress

Increase your:
- Productivity
- Bearing reliability
- Machine performance
Taking on your biggest challenge

Tough enough for heavy-duty industries
- Mining
- Mineral processing
- Cement
- Pulp and paper
- Metals
- Power generation
- Sugar cane

And a wide range of applications
- Conveyor pulleys
- Rope sheaves
- Bucket elevators
- Stackers/reclaimers
- Hoists and winches
- Horizontal grinding mill pinions
- Mixers and agitators
- Jack shafts
- Fans

Customer case:
Saving 30 hours of downtime – and millions in lost production

At an iron ore operation in Western Australia, a belt conveyor drive pulley bearing urgently needed replacement due to catastrophic failure. Unplanned downtime was expected to reach 60 hours, which included repair to the housing and the shaft.

However, with an SKF Cooper split spherical roller bearing designed to replace the standard bearing in situ without changing the shaft alignment or driveline, the customer managed to save 30 hours of downtime and avoid 10 million AUD in lost production.

Boost worker safety

43% of accidents in the mining and cement industry occur while workers perform maintenance or checks on conveyors. With the SKF Cooper split spherical roller bearings, there is no need to dismount the drive coupling or the cantilevered drive to replace the bearing thus avoiding realignment. This greatly reduces the safety risk to workers.

Enhance reliability and reduce costs with the SKF Three-barrier solution

The SKF Three-barrier solution consists of sealed SKF Cooper split spherical roller bearings mounted in a sealed SKF split block housing with a grease barrier inside. The SKF Three-barrier solution is proven to increase bearing service life more than three times and reduce maintenance and lubrication consumption by around 90%. It is an environmentally friendly, cost-effective solution that extends bearing service life and reduces maintenance costs, without complicated and expensive housing sealings.
SKF Cooper split spherical roller bearings are manufactured to ISO Normal precision and running accuracy. The mounted radial initial clearance of the split bearing is slightly more or less than the mounted clearance of a standard (CN) spherical bearing mounted on an adapter sleeve. Other bearing internal clearances (e.g. C3) are available upon request. The SKF Cooper split spherical roller bearing can be used with SKF metric and inch split block housings. The split bearing outer shroud is the same dimension as a standard ISO spherical bearing outer ring.

Minimum load

The required minimum load to be applied to spherical roller bearings can be estimated using \( P_e = 0.2 C_c \) where \( P_e \) = Equivalent minimum load, kN \( C_c \) = Bearing basic dynamic load capacity, kN

Shaft and housing fitting

Shaft: ISO 9121 ETI2 and surface roughness, Ra 0.8

Housing: ISO 281 (T120)

Grease lubrication (grease ordered separately)

Fill the bearing with one of the following recommended SKF greases at assembly:

- Alternative Lithium/Lithium Complex NLGI 2 grease with base oil viscosity of 14 cSt or similar oil can be used.
- The bearing should be relubricated with grease through its W33 groove as required.

Other bearing internal clearances (e.g. C3) are available upon request. The SKF Cooper split spherical roller bearing has two times longer rating life than the unsealed split bearing. The split bearing is adequately lubricated for normal operating conditions.

Permisible axial load

The permissible axial load of a spherical roller bearing is given by the following formula:

\[ P_a = \frac{C_r}{1.5} \]

Oil lubrication

Use ISO VG 220 oil or ISO VG 320 oil as required.

Bearing equivalent load, \( P_e \)

The bearing equivalent load is calculated the same as a standard (non-split) spherical roller bearing with a dynamic factor \( C_p \).

ISO modified rating life, \( L_{10h} \)

The modified rating life is calculated the same as a standard spherical bearing using the following formula:

\[ L_{10h,mod} = \frac{L_{10} 
\times \frac{P_e}{P}}{60000} \]

Bearing oil temperatures

The requisite minimum load to be used is calculated the same as a standard spherical bearing.

Principal dimensions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaft diameter</td>
<td>240</td>
<td>260</td>
<td>280</td>
<td>300</td>
<td>320</td>
<td>340</td>
<td>360</td>
<td>380</td>
<td>400</td>
<td>410</td>
<td>430</td>
<td>450</td>
</tr>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>D</td>
<td>440</td>
<td>440</td>
<td>440</td>
<td>440</td>
<td>440</td>
<td>440</td>
<td>440</td>
<td>440</td>
<td>440</td>
<td>440</td>
<td>440</td>
<td>440</td>
</tr>
<tr>
<td>B</td>
<td>144</td>
<td>144</td>
<td>144</td>
<td>144</td>
<td>144</td>
<td>144</td>
<td>144</td>
<td>144</td>
<td>144</td>
<td>144</td>
<td>144</td>
<td>144</td>
</tr>
<tr>
<td>C</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>d</td>
<td>277</td>
<td>277</td>
<td>277</td>
<td>277</td>
<td>277</td>
<td>277</td>
<td>277</td>
<td>277</td>
<td>277</td>
<td>277</td>
<td>277</td>
<td>277</td>
</tr>
<tr>
<td>D</td>
<td>386</td>
<td>386</td>
<td>386</td>
<td>386</td>
<td>386</td>
<td>386</td>
<td>386</td>
<td>386</td>
<td>386</td>
<td>386</td>
<td>386</td>
<td>386</td>
</tr>
<tr>
<td>B</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td>365</td>
</tr>
<tr>
<td>C</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>d</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>LGB2</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
<tr>
<td>Y</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
</tr>
<tr>
<td>K</td>
<td>510</td>
<td>510</td>
<td>510</td>
<td>510</td>
<td>510</td>
<td>510</td>
<td>510</td>
<td>510</td>
<td>510</td>
<td>510</td>
<td>510</td>
<td>510</td>
</tr>
</tbody>
</table>

Calculation factors

- \( Y = d^0.31 \) or \( Y = 2,2 \times d^0.3 \)
- \( K = 0,3 \times B \)
- \( L_{10h} = 500000 \times (1000000 - n^0.3) \)

Sealed bearings have a permissible axial shaft clamp load capa-

Owing to the steel inner ring clamp ring between the inner and outer ring of 2° for bearings with shell diameter less than 280 mm and 3° for bearings with 280 mm shell diameter and larger.

The split spherical roller bearing has a permissible angular misalignment of 0.5°. Thus the permissible misalignment as the SKF Tapered seal mounted in the SKF split block housing.

Consulat SKF for availability of inch dimension bearings and other series of sizes.