Four-row taper roller bearings without spacer rings – mounting and maintenance instructions
Made by SKF® stands for excellence. It symbolises our consistent endeavour to achieve total quality in everything we do. For those who use our products, “Made by SKF” implies three main benefits.

**Reliability** — thanks to modern, efficient products, based on our worldwide application know-how, optimised materials, forward-looking designs and the most advanced production techniques.

**Cost effectiveness** — resulting from the favourable ratio between our product quality plus service facilities, and the purchase price of the product.

**Market lead** — which you can achieve by taking advantage of our products and services. Increased operating time and reduced down-time, as well as improved output and product quality are the key to a successful partnership.

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User-friendly and reliable

Four-row taper roller bearings without spacer rings are an SKF development. They have the same envelope dimensions as the more conventional bearings with spacer rings but offer the following advantages:

- fewer bearing components which simplifies mounting and dismounting;
- reduced inner ring width tolerance which facilitates the axial location of the bearing on the roll neck;
- a more favourable load distribution in the bearing which extends bearing life.

These SKF taper roller bearings are quality products representing a considerable investment and as such should be handled carefully.

The trouble-free operation of such bearings is not just a question of bearing quality as several other factors, including the following, influence their service life.

Correct mounting
It is necessary to employ the proper methods and use appropriate tools so that no damage is caused to the bearings.

Proper maintenance
The bearings should be regularly maintained and also dismounted at intervals to turn the position of the loaded zone through 90° in order to achieve maximum bearing life.

Experience
Skill and experience with mounting multi-row taper roller bearings are also important for long bearing life. It is therefore recommended that these instructions are studied and all tools and other aids prepared for the mounting operation. If experience is lacking, the nearest SKF Service Centre should be contacted.

Packaging
SKF four-row taper roller bearings are supplied in one or more packages, depending on size. All the components of a bearing are marked with the same consecutive number to avoid mixing if several bearings of the same size are to be mounted. The components of bearings of the same type and size are not interchangeable.

Environment
Cleanliness during mounting is a prerequisite for the correct performance of the bearings and to ensure that they do not fail prematurely.

NB. To avoid contaminating the bearings, they should only be removed from their packaging immediately prior to mounting.
Matched bearing components

The components of four-row taper roller bearings must be assembled in a given order.
This order is indicated by letters and the consecutive number allocated to the bearing, e.g. 2A (➔ fig 3). The correct order must be followed if the bearing is to function properly.
To facilitate correct assembly mounting instructions (➔ fig 2) are supplied with each bearing.

Load zone markings

The side faces of the outer rings are divided into four zones marked I to IV (➔ fig 3). The marking for zone 1 also extends across the outside diameter of all four rings.
When mounting the bearing for the first time it is usual to arrange that zone I lies in the direction of the load, i.e. it will be the loaded zone. When remounting the bearing, the outer rings should be turned clockwise through 90° so that the next zone comes under load.
Mounting bearings without seals

Preparing the chock

- Take care to see that the area in which mounting is to take place is clean.
- Position the chock in the same way as it will be after mounting on the roll stand.
- Clean the lubrication and ventilation ducts with compressed air and solvent (➔ fig 4).
- Use a magnetic rod to remove any remaining turnings from all holes.
- Check that the transitions to the lubrication ducts in the chock are well rounded as otherwise the O-rings in grooves in the bearing outer rings (of sealed bearings) can be damaged when the bearing is lifted into the chock.
- Lightly coat the chock bore with SKF mounting paste LGAF 3.
- If required, lay the O-ring used to seal the roll-side cover in position.
- Screw the roll-side cover on to the chock (➔ fig 5).
- Stand the chock on the roll-side cover.
Mounting bearings without seals

Assembling the bearing

- For grease lubricated bearings, fill the free space between the rollers and the roller rows with grease.
- Place wooden blocks under the inner ring C-D so that they do not come into contact with the cage (➔ fig 6) as otherwise the cage may be damaged.
- Position the other bearing rings (except outer ring D) on the inner ring C-D (➔ fig 7).
- Check that the lines indicating load zone 1 are in alignment.
Lifting the bearing

- Apply the lifting tool under outer ring D (➔ fig 8) and lift into the chock bore. When mounting for the first time, the load zone I line should be positioned as shown (➔ fig 8). If appropriate, mark the position of zone I on the top of the chock.
- Lift the other bearing components into the chock bore taking care that the load zone I markings on all four outer rings line up (➔ fig 10).
- Note the bearing number, the chock number and the roll number as well as the actual loaded zone on the report sheet “Bearing position” (➔ Supplement, page 23).
Mounting bearings without seals

Turning the bearing

- Place second chock cover in position and hold in place using four screws (➔ fig 11).
- Turn chock into mounting position.
- Position tool in bearing bore.
- Turn inner rings with roller and cage assemblies alternately and tighten nuts and cover screws.
- Use a feeler gauge to check that inner rings abut each other (➔ fig 12).
- Measure gap between chock face and cover (➔ fig 13).
- Remove the cover.
• Insert the seal (➔ fig 14).
  
a) The elastic cork seal should be 1,2 times as thick as the measured gap.

b) If axial loads are high, it may be necessary to use spacing washers between the chock and the end cover. These should be 0,05 mm thinner than the measured gap and be positioned under the screws. The cork seal should be 1,2 times as thick as the measured gap.

c) If sheet metal shims are used together with an O-ring, the sheet thickness should be 0,05 mm thinner than the gap.

• Replace the cover and tighten screws crosswise and alternately.

• Remove tool from bearing bore.
Mounting the chock

Pushing the chock on to the roll neck (➔ fig 15):
- Coat bearing bore and seating surfaces with SKF mounting paste LGAF 3.
- Align the chock with assembled bearing and push the chock on to the roll neck until it abuts the roll.

Locating on the roll neck

Alternative 1:
Simple axial location (➔ fig 16)
- Push distance ring A on to the roll neck and fix the split clamping ring B in position. The requisite axial gap of 0,4 to 1,3 mm between the inner rings and the abutments will be obtained provided the distance ring, clamping ring and clamping ring groove are correctly dimensioned.

Alternative 2:
Conventional axial location (➔ fig 17)
- Push distance ring A and nut B into position and fix clamping ring C in position.
- Tighten nut B until it abuts the clamping ring C.
- Loosen nut B until the requisite axial gap of 0,4 to 1,3 mm has been obtained.
Mounting sealed bearings

- Fill the free space between the rollers and roller rows with grease.
- Fill the space between the two lips of the radial shaft seal with grease (➔ fig 18).
- Fill the annular groove in the bearing bore for the seal between the inner ring with grease (➔ fig 19).
- Coat the counterfaces (inner ring extensions) for the seals with grease.
- Assemble the bearing components in the correct order starting with outer ring D, supporting the bearing on wooden blocks (➔ fig 20).
- Use lifting tool to insert bearing into the chock bore so that the load zone I markings line up.
- Tip the chock and remove the lifting tool. Insert the clamping tool and ensure that the holding shoe (H) engages the inner ring face and tighten (➔ fig 21).
- Turn the bearing (➔ pages 8 and 9).
• Use “Bearing check list” (Supplement, page 23).
• Dismount the bearing in the reverse order of mounting (fig 22 and pages 10 to 7).
• Clean all the bearing components carefully and oil them.
• Check the raceways in the ring and on the rollers for damage.
• If damage is only slight it should be repaired by the user; where greater damage is seen, the nearest SKF Service Centre should be contacted.
• Clean the chock and roll neck and check the dimensional and form accuracy; rework if necessary (pages 21 and 22).
• With sealed bearings clean any water drainage ducts (figs 23 and 24).
• With sealed bearings, replace O-rings and damaged seals (fig 25).
Measuring and correcting axial clearance

After an operating period of some 2 000 to 3 000 hours the axial internal clearance of four-row taper roller bearings should be checked. If required, this can be performed by an SKF Service Centre.

If the bearings are to be reworked on site, the actual bearing clearance should be accurately determined. If the clearance exceeds three times the original axial clearance of the bearing when new, the bearing should be reworked.

Measuring equipment

To measure the bearing clearance suitable measuring equipment must be used. Such equipment is, for example, the well-proven equipment shown in fig 26. This is adjustable and can be used for a range of diameters. The three-point support can also be adjusted. A gauge is mounted on each of the three arms which are at 120° to each other.

Measuring procedure

Before making the measurement, the equipment should be placed on a flat surface and the gauges should be adjusted to show zero.

To measure the stand-out or stand-in of the outer ring in relation to the inner ring, the equipment should be positioned on the face of the inner ring. The gauges placed on the face of the outer ring will then indicate the stand-out or stand-in of the outer ring. The results should be entered in a “Test report: Determination of axial internal clearance” (→ Supplement, page 23)

The mean value should be determined. The various steps required to determine the bearing axial internal clearance are given in the following. The evaluation of the measured results and the determination of the requisite new outer ring width are shown on page 19 using four-row taper roller bearing BT4B 328817 BG/HA1VA901 as the example.

The flow chart on page 18 gives an overview of the procedure.

Symbols

The symbols used in the evaluation of the bearing clearance are listed below and explained.

- \( A_{AB} \) Axial clearance between roller rows A and B
- \( A_{BC} \) Axial clearance between roller rows B and C
- \( A_{CD} \) Axial clearance between roller rows C and D
- \( A_0 \) Original axial internal clearance of the bearing as delivered (given on bearing drawing)
- \( B_{AB} \) Width of inner ring A–B
- \( B_{CD} \) Width of inner ring C–D
- \( C_A \) Width of outer ring A
- \( C_B \) Width of outer ring B
- \( C_{B1} \) Width of outer ring B after regrinding the narrow face
- \( C_C \) Width of outer ring C
- \( C_{C1} \) Width of outer ring C after regrinding the narrow face
- \( C_{C2} \) Width of outer ring C after regrinding the wide face
- \( C_D \) Width of outer ring D
- \( S_A \) Mean stand-out/stand-in of outer ring A with respect to inner ring A–B
- \( S_B \) Mean stand-out/stand-in of outer ring B with respect to inner ring A–B
- \( S_C \) Mean stand-out/stand-in of outer ring C with respect to inner ring C–D
- \( S_D \) Mean stand-out/stand-in of outer ring D with respect to inner ring C–D
- \( W \) Width of spacer ring
**Determination of the axial internal clearance between roller rows A and B**

- Check that bearing components are clean and if necessary wash and oil.
- Measure outer ring widths \( C_A \) and \( C_B \) and inner ring width \( B_{AB} \).
- Lay inner ring A–B on a suitable support with the B side downwards and place outer ring A over the cage and roller assembly (➔ fig 27).
- Turn outer ring A so that all of the rollers of the upper roller row are in contact with the inner ring guide flange.
- Position measuring equipment on inner ring face and read off the three values of \( S_A \) on the gauges; enter in test report.
- Remove equipment.
- Turn inner ring A–B over so that the A side is downwards and place outer ring B over the cage and roller assembly (➔ fig 28).
- Turn outer ring B so that all of the rollers of the upper roller row are in contact with the inner ring guide flange.
- Position measuring equipment on inner ring face and read off the three values \( S_B \) on the gauges; enter in test report.
- Determine the axial clearance between roller rows A and B from

\[
A_{AB} = C_A + C_B - S_A - S_B - B_{AB}
\]

If the outer ring stands out (➔ fig 29) the measured values for \( S_A \) and \( S_B \) should be considered positive, i.e. entered with a + sign. If the inner ring stands out (➔ fig 30) then the values should have a – sign both in the test report and in the equation above. This is referred to as outer ring stand-in.
If the value of the axial clearance $A_{AB}$ determined as above is much greater than the original clearance $A_0$ ($A_{AB} \geq 3 A_0$), the narrow face of outer ring B should be ground down (→ fig 31). The final width of the outer ring B after grinding is obtained from

$$C_{B1} = C_B - A_{AB} + A_0$$

The absolute value of the axial clearance $A_{AB}$ should be inserted in the equation.
Determination of the axial internal clearance between roller rows C and D

- Check that bearing components are clean and if necessary wash and oil.
- Measure outer ring widths $C_C$ and $C_D$ and inner ring width $B_{CD}$.
- Lay inner ring C–D on a suitable support with the C side downwards and place outer ring D over the cage and roller assembly (➔ fig 32).
- Turn outer ring D so that all of the rollers of the upper roller row are in contact with the inner ring guide flange.
- Position measuring equipment on inner ring face and read off the three values of $S_D$ on the gauges; enter in test report.
- Remove equipment.
- Turn inner ring C–D over so that the D side is downwards and place outer ring C over the cage and roller assembly (➔ fig 33).
- Turn outer ring C so that all of the rollers of the upper roller row are in contact with the inner ring guide flange.
- Position measuring equipment on inner ring face and read off the three values $S_C$ on the gauges; enter in test report.
- Determine the axial clearance between roller rows C and D from

$$A_{CD} = C_C + C_D - S_C - S_D - B_{CD}$$

If the outer ring stands out (➔ fig 34) the measured values for $S_C$ and $S_D$ should be considered positive, i.e. entered with a + sign. If the inner ring stands out (➔ fig 35) then the values should have a – sign both in the test report and in the equation above. This is referred to as outer ring stand-in.
If the value of the axial clearance $A_{CD}$ determined as above is much greater than the original clearance ($A_{CD} \geq 3A_0$), the narrow face of outer ring C should be ground down (→ fig 36). The final width of the outer ring C after grinding is obtained from

$$C_{C1} = C_C - A_{CD} + A_0$$

The absolute value of the axial clearance $A_{CD}$ should be inserted in the equation.

---

**Determination of the axial internal clearance between roller rows B and C**

- Determine the axial clearance between the roller rows B and C using

$$A_{BC} = S_B + S_C$$

If the value obtained is much greater than the original axial clearance ($A_{BC} \geq 3A_0$) a spacing washer should be fitted between the outer rings B and C.

- The spacing washer can be made from commercial cold rolled steel sheet. The thickness should always be greater than the value of $A_{BC}$.

- Measure the actual thickness of the washer.

- The final width of the outer ring C after grinding can be calculated from

$$C_{C2} = C_{C1} + A_{BC} - W - A_0$$

The absolute value of the axial clearance $A_{BC}$ should be inserted in the equation.

- Grind the wide face of outer ring C to the final width $C_{C2}$ (→ fig 37).

---

**NB.**
The outer ring C must only be ground on the wide face to give the final width $C_{C2}$. Any grinding of the narrow face at this stage would mean that the clearance between roller rows C and D would be too small and would lead to premature bearing failure.
Flow chart for measuring and correcting the axial internal clearance

1. **Start**
2. **Sealed bearing**
   - **Dismount seal**
   - **Clean and oil bearing components**
   - **Measure**
     - outer ring width
     - inner ring width
     - stand-out/stand-in
   - **Determine axial clearance between**
     - roller rows A and B
     - roller rows C and D
     - roller rows B and C
   - **Compare with original axial internal clearance A₀**
   - **Axial clearance A₀ known**
   - **Read off from bearing drawing or ask SKF**
   - **Measured axial clearance ≥ 3A₀**
   - **Calculate new widths for outer rings B and C**
   - **Make spacing washer**
   - **Grind narrow face of outer ring B**
   - **Grind narrow face of outer ring C to C₁**
   - **Grind wide face of outer ring C to C₂**
   - **Clean bearing rings and oil**
   - **Sealed bearing**
   - **Insert new seal**
   - **Pack bearing components keeping those of each individual bearing separate**
3. **End**
Test report: Determination of axial internal clearance

Example of a test report for bearing BT4B 328817 BG/HA1VA901

Original axial internal clearance = 0.440 mm

### Part 1: Calculation of axial clearance

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Measuring position a</th>
<th>Measuring position b</th>
<th>Measuring position c</th>
<th>Mean a + b + c</th>
<th>Calculated axial clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
</tbody>
</table>

#### Axial clearance between roller rows A and B

- Outer ring width C_A
- Outer ring width C_B
- Inner ring width B_AB
- Stand-out/in S_A
- Stand-out/in S_B

#### Axial clearance between roller rows C and D

- Outer ring width C_C
- Outer ring width C_D
- Inner ring width B_CD
- Stand-out/in S_C
- Stand-out/in S_D

#### Axial clearance between roller rows B and C

- Outer ring width C_B
- Outer ring width C_C

### Part 2: Calculation of new widths for outer rings

<table>
<thead>
<tr>
<th>Outer ring/surface to be ground</th>
<th>Width</th>
<th>Width W of spacer washer</th>
<th>Calculated axial clearance</th>
<th>New width</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
</tbody>
</table>

- Outer ring B narrow face
- Outer ring C narrow face
- Outer ring C wide face

NB. The absolute values (i.e. the numerical value without + or – sign) of the axial clearances A_{AB}, A_{CD} and A_{BC} should be used to calculate the new outer ring widths C_{AB}, C_{CD} and C_{BC}. This is signified by the two vertical lines, e.g. |A_{BC}|
Seal replacement

Sealed four-row taper roller bearings are supplied with the radial shaft seals already installed. If the seals have become so worn or damaged as to be unserviceable, they must be replaced by new seals which are available from SKF. During replacement, care must be taken not to damage the outer ring raceway.

- Lay outer ring on wooden blocks, leaving the seal unsupported (➔ fig 39).
- Remove radial shaft seal.
- Press new seal into the outer ring (➔ fig 39). The seal must fit tightly.
- Fix the seal at eight positions (➔ fig 40).
Table 1

Checking the chock

The arduous operating conditions to which a roll neck bearing is subjected cause wear and deformation of the chock. This leads in turn to unfavourable load distribution in the bearing and foreshortens bearing life. It is therefore recommended that the chocks should be reworked provided the limits given in Table 1 are not exceeded.

<table>
<thead>
<tr>
<th>Bore diameter Nominal over incl.</th>
<th>Tolerances high</th>
<th>Tolerances low</th>
<th>Permissible deviation from nominal diameter max</th>
<th>Permissible deviation from cylindricity max</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td><strong>Bearings with inch dimensions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>–</td>
<td>+0.076</td>
<td>+0.050</td>
<td>+0.15</td>
<td>0.11</td>
</tr>
<tr>
<td>304.8</td>
<td>+0.152</td>
<td>+0.102</td>
<td>+0.25</td>
<td>0.15</td>
</tr>
<tr>
<td>609.6</td>
<td>+0.229</td>
<td>+0.152</td>
<td>+0.35</td>
<td>0.20</td>
</tr>
<tr>
<td>914.4</td>
<td>+0.204</td>
<td>–</td>
<td>+0.47</td>
<td>0.23</td>
</tr>
<tr>
<td>1 219.2</td>
<td>+0.254</td>
<td>–</td>
<td>+0.57</td>
<td>0.27</td>
</tr>
<tr>
<td>1 524</td>
<td>+0.300</td>
<td>–</td>
<td>+0.64</td>
<td>0.32</td>
</tr>
<tr>
<td><strong>Bearings with metric dimensions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>+0.041</td>
<td>+0.025</td>
<td>+0.12</td>
<td>0.11</td>
</tr>
<tr>
<td>180</td>
<td>+0.046</td>
<td>+0.025</td>
<td>+0.12</td>
<td>0.11</td>
</tr>
<tr>
<td>250</td>
<td>+0.051</td>
<td>+0.025</td>
<td>+0.12</td>
<td>0.11</td>
</tr>
<tr>
<td>315</td>
<td>+0.051</td>
<td>+0.051</td>
<td>+0.20</td>
<td>0.15</td>
</tr>
<tr>
<td>400</td>
<td>+0.051</td>
<td>+0.051</td>
<td>+0.20</td>
<td>0.15</td>
</tr>
<tr>
<td>500</td>
<td>+0.112</td>
<td>+0.051</td>
<td>+0.20</td>
<td>0.15</td>
</tr>
<tr>
<td>630</td>
<td>+0.129</td>
<td>+0.076</td>
<td>+0.25</td>
<td>0.20</td>
</tr>
<tr>
<td>800</td>
<td>+0.154</td>
<td>+0.076</td>
<td>+0.25</td>
<td>0.20</td>
</tr>
<tr>
<td>1 000</td>
<td>+0.180</td>
<td>+0.102</td>
<td>+0.35</td>
<td>0.23</td>
</tr>
<tr>
<td>1 250</td>
<td>+0.221</td>
<td>+0.127</td>
<td>+0.41</td>
<td>0.27</td>
</tr>
<tr>
<td>1 600</td>
<td>+0.250</td>
<td>+0.163</td>
<td>+0.47</td>
<td>0.32</td>
</tr>
</tbody>
</table>
Checking the roll neck

Four-row taper roller bearings are generally mounted with a loose fit on the roll neck. The resultant relative movements between bearing and roll neck lead to wear. To limit the misalignment of the roll and the eccentricity of the bearing to the roll, it is recommended that when grinding the roll neck, the limits given in Table 2 are respected.

### Table 2: Permissible roll neck diameter limits

<table>
<thead>
<tr>
<th>Roll neck diameter Nominal over incl.</th>
<th>Tolerances (e7) high</th>
<th>Permissible deviation from nominal diameter low max</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>Bearings with inch dimensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120 152.4</td>
<td>-0.085</td>
<td>-0.125 -0.35</td>
</tr>
<tr>
<td>152.4 180</td>
<td>-0.085</td>
<td>-0.125 -0.45</td>
</tr>
<tr>
<td>180 250</td>
<td>-0.100</td>
<td>-0.146 -0.45</td>
</tr>
<tr>
<td>250 304.8</td>
<td>-0.110</td>
<td>-0.162 -0.45</td>
</tr>
<tr>
<td>304.8 315</td>
<td>-0.110</td>
<td>-0.162 -0.60</td>
</tr>
<tr>
<td>315 400</td>
<td>-0.125</td>
<td>-0.182 -0.60</td>
</tr>
<tr>
<td>400 500</td>
<td>-0.135</td>
<td>-0.198 -0.60</td>
</tr>
<tr>
<td>500 609.6</td>
<td>-0.145</td>
<td>-0.215 -0.60</td>
</tr>
<tr>
<td>609.6 630</td>
<td>-0.145</td>
<td>-0.215 -0.80</td>
</tr>
<tr>
<td>630 800</td>
<td>-0.160</td>
<td>-0.240 -0.80</td>
</tr>
<tr>
<td>800 914.4</td>
<td>-0.170</td>
<td>-0.260 -0.80</td>
</tr>
<tr>
<td>914.4 1 000</td>
<td>-0.170</td>
<td>-0.260 -1.00</td>
</tr>
<tr>
<td>1 000 1 219.2</td>
<td>-0.195</td>
<td>-0.300 -1.00</td>
</tr>
<tr>
<td>1 219.2 1 250</td>
<td>-0.195</td>
<td>-0.300 -1.20</td>
</tr>
<tr>
<td>1 250 1 524</td>
<td>-0.220</td>
<td>-0.345 -1.20</td>
</tr>
</tbody>
</table>

| Bearings with metric dimensions      |                      |                                                     |
| 120 180                              | -0.110               | -0.150 -0.37                                        |
| 180 250                              | -0.130               | -0.171 -0.48                                        |
| 250 315                              | -0.145               | -0.187 -0.48                                        |
| 315 400                              | -0.165               | -0.233 -0.64                                        |
| 400 500                              | -0.180               | -0.249 -0.64                                        |
| 500 630                              | -0.195               | -0.266 -0.64                                        |
| 630 800                              | -0.235               | -0.316 -0.87                                        |
| 800 1 000                            | -0.270               | -0.336 -0.87                                        |
| 1 000 1 250                          | -0.320               | -0.402 -1.10                                        |
| 1 250 1 600                          | -0.380               | -0.472 -1.30                                        |
Supplement

Forms to copy
Bearing position
Bearing check list
Test report: Determination of axial internal clearance
<table>
<thead>
<tr>
<th>Bearing position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Train</td>
</tr>
<tr>
<td>Stand and No.</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Bearing designation</td>
</tr>
</tbody>
</table>

### Drive side

- **Chock No.:**
- **Bearing No.:**
- **Upper roll No./ Company:**
- **Load zone No.:**
- **Lower roll No./Company:**
- **Load zone No.:**
- **Bearing No.:**
- **Chock No.:**

### Operator side

- **Chock No.:**
- **Bearing No.:**
- **Load zone No.:**
- **Chock No.:**
- **Bearing No.:**
- **Load zone No.:**
- **Chock No.:**
- **Bearing No.:**
# Bearing check list

<table>
<thead>
<tr>
<th>Bearing type</th>
<th>Bearing designation</th>
<th>Consecutive number of bearing</th>
<th>Delivery date</th>
<th>Delivery number</th>
<th>From</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Bearing dimensions: Bore diameter</th>
<th>Outside diameter</th>
<th>Width</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Bearing position</th>
<th>Chock No.</th>
<th>Drive side (A)</th>
<th>Operator side (B)</th>
<th>Hours of operation</th>
<th>Production in tonnes</th>
<th>Lubricant</th>
<th>Remarks</th>
<th>Signed</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Mounted Dismounted Date</th>
<th>Position</th>
<th>Roll No.</th>
<th>Roll side/Outboard</th>
<th>Upper roll/Lower roll</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounted Date</td>
<td>Dept./Train</td>
<td>Stand No.</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
## Test report: Determination of axial internal clearance

### Part 1: Calculation of axial clearance

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Measuring position a</th>
<th>Measuring position b</th>
<th>Measuring position c</th>
<th>Mean $a + b + c$</th>
<th>Calculated axial clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
</tbody>
</table>

Axial clearance between roller rows A and B

Axial clearance $A_{AB}$

Outer ring width $C_A$

$A_{AB} = C_A + C_B - S_A - S_B - B_{AB}$

Outer ring width $C_B$

$A_{AB} = $

Inner ring width $B_{ab}$

$A_{AB} = $

Stand-out/in $S_A$

$A_{AB} = $

Stand-out/in $S_B$

$A_{AB} = $

Axial clearance between roller rows C and D

Axial clearance $A_{CD}$

Outer ring width $C_C$

$A_{CD} = C_C + C_D - S_C - S_D - B_{CD}$

Outer ring width $C_D$

$A_{CD} = $

Inner ring width $B_{cd}$

$A_{CD} = $

Stand-out/in $S_C$

$A_{CD} = $

Stand-out/in $S_D$

$A_{CD} = $

Axial clearance between roller rows B and C

Axial clearance $A_{BC}$

$A_{BC} = S_B + S_C$

$A_{BC} = $

$A_{BC} = $

### Part 2: Calculation of new widths for outer rings

<table>
<thead>
<tr>
<th>Outer ring/surface to be ground</th>
<th>Width $W$ of spacer washer</th>
<th>Calculated axial clearance $A_{AB}$</th>
<th>New width $C_{AB}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer ring B narrow face</td>
<td>$C_B = $</td>
<td>$A_{AB} = $</td>
<td>$C_{BI} = C_B -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$C_{BI} = $</td>
</tr>
<tr>
<td>Outer ring C narrow face</td>
<td>$C_C = $</td>
<td>$A_{CD} = $</td>
<td>$C_{CI} = C_C -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$C_{CI} = $</td>
</tr>
<tr>
<td>Outer ring C wide face</td>
<td>$C_{CI} = $</td>
<td>$A_{BC} = $</td>
<td>$C_{CII} = C_{CI} +</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$C_{CII} = $</td>
</tr>
</tbody>
</table>

NB. The absolute values (i.e. the numerical value without + or − sign) of the axial clearances $A_{AB}$, $A_{CD}$ and $A_{BC}$ should be used to calculate the new outer ring widths $C_{BI}$, $C_{CI}$ and $C_{CII}$. This is signified by the two vertical lines, e.g. $|A_{BC}|$.
The SKF Group – a worldwide corporation

SKF is an international industrial Group operating in some 130 countries and is world leader in bearings.

The company was founded in 1907 following the invention of the self-aligning ball bearing by Sven Wingquist and, after only a few years, SKF began to expand all over the world.

Today, SKF has some 45 000 employees and around 80 manufacturing facilities spread throughout the world. An international sales network includes a large number of sales companies and some 7 000 distributors and retailers. Worldwide availability of SKF products is supported by a comprehensive technical advisory service.

The key to success has been a consistent emphasis on maintaining the highest quality of its products and services. Continuous investment in research and development has also played a vital role, resulting in many examples of epoch-making innovations.

The business of the Group consists of bearings, seals, special steel and a comprehensive range of other high-tech industrial components. The experience gained in these various fields provides SKF with the essential knowledge and expertise required in order to provide the customers with the most advanced engineering products and efficient service.
The SKF Group is the first major bearing manufacturer to have been granted approval according to ISO 14001, the international standard for environmental management systems. The certificate is the most comprehensive of its kind and covers more than 60 SKF production units in 17 countries.

The SKF Engineering & Research Centre is situated just outside Utrecht in The Netherlands. In an area of 17,000 square metres (185,000 sq.ft) some 150 scientists, engineers and support staff are engaged in the further improvement of bearing performance. They are developing technologies aimed at achieving better materials, better designs, better lubricants and better seals – together leading to an even better understanding of the operation of a bearing in its application. This is also where the SKF Life Theory was evolved, enabling the design of bearings which are even more compact and offer even longer operational life.

SKF has developed the Channel concept in factories all over the world. This drastically reduces the lead time from raw material to end product as well as work in progress and finished goods in stock. The concept enables faster and smoother information flow, eliminates bottlenecks and bypasses unnecessary steps in production. The Channel team members have the knowledge and commitment needed to share the responsibility for fulfilling objectives in areas such as quality, delivery time, production flow etc.

SKF manufactures ball bearings, roller bearings and plain bearings. The smallest are just a few millimetres (a fraction of an inch) in diameter, the largest several metres. SKF also manufactures bearing and oil seals which prevent dirt from entering and lubricant from leaking out. SKF’s subsidiaries CR and RFT S.p.A. are among the world’s largest producers of seals.