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› SKF 33220 Tapered Roller Bearing User Manual

SKF 33220

SKF 33220 Tapered Roller Bearing User Manual

Model: 33220

PRODUCT OVERVIEW

The SKF 33220 is a high-quality single row tapered roller bearing designed to accommodate combined (radial and axial) loads. The axial load carrying capacity of the bearing increases with increasing contact angle (α). The contact angle is the angle between the generatrix of the raceway and the roller, along which the load is transmitted from one raceway to the other, and a line perpendicular to the bearing axis.

These bearings are separable, meaning the inner ring with the roller and cage assembly (cone) can be mounted separately from the outer ring (cup). This design facilitates easier mounting and dismounting, especially where the inner and outer rings are required to have an interference fit.



Figure 1: Cross-section of the SKF 33220 Tapered Roller Bearing. This image displays a detailed cross-section of the SKF 33220 Tapered Roller Bearing, highlighting its internal components such as the inner ring, outer ring, tapered rollers, and cage. The design is optimized for handling combined radial and axial loads.

SPECIFICATIONS

Category	Tapered roller bearings
Cage Material	Sheet steel
Temperature Range	-30 to +120 °C
Tolerance Class	P0/PN2 / ABEC 1
Roller Rows	Single row
Product Range	Complete tapered roller bearing

Arrangement	Standard version
Weight	6.730 kg (6.7 Kilograms)
Inner Dimension (d)	100.000 mm
Outer Dimension (D)	180.000 mm
Width (B)	63.000 mm
Bearing Type	Roller Bearing
Compatible Lubricant	Grease
Country of Origin	Germany
Manufacturer Part Number	38474
EAN	7316577662828

INSTALLATION GUIDELINES

Proper installation is crucial for the optimal performance and longevity of the SKF 33220 tapered roller bearing. Incorrect installation can lead to premature failure, increased noise, and reduced efficiency.

Preparation

- **Cleanliness:** Ensure that the bearing, shaft, and housing are thoroughly clean and free from any contaminants such as dust, dirt, metal chips, or old lubricant. Even small particles can significantly reduce bearing life.
- **Inspection:** Inspect the shaft and housing for any burrs, nicks, or damage that could interfere with proper seating or cause stress concentrations.
- **Tools:** Use appropriate tools for installation. Avoid direct hammering on the bearing rings or rolling elements.

Mounting

Tapered roller bearings are separable, allowing the cone (inner ring with rollers and cage) and cup (outer ring) to be mounted independently.

- **Heat Mounting (Recommended for Inner Ring):** For interference fits, heating the inner ring (cone) to a temperature between 80°C and 100°C (176°F and 212°F) can facilitate easier mounting onto the shaft. Do not exceed 120°C (248°F) as this can affect the bearing material properties. Use an induction heater or an oil bath for controlled heating.
- **Press Fitting (for Outer Ring):** The outer ring (cup) is typically press-fitted into the housing. Apply pressure evenly to the face of the outer ring using a press or a suitable mounting tool. Ensure the cup is seated squarely and fully in the housing bore.
- **Mechanical Mounting:** For smaller bearings or lighter interference fits, a mounting sleeve and hammer can be used, ensuring force is applied only to the ring being fitted (e.g., inner ring when mounting on a shaft, outer ring when mounting in a housing).
- **Axial Clearance/Preload:** After mounting both components, the correct axial clearance or preload must be set. This is critical for bearing performance and life. Refer to specific application requirements or manufacturer guidelines for precise settings.

Initial Lubrication

Before operation, ensure the bearing is adequately lubricated with a compatible grease, as specified in the specifications.

Fill the bearing cavity and surrounding space according to application requirements.

OPERATING PRINCIPLES

The SKF 33220 tapered roller bearing is designed to support both radial and axial loads simultaneously. The tapered design of the raceways and rollers allows the bearing to handle these combined loads efficiently. The angle of the taper determines the proportion of axial load the bearing can withstand.

- **Load Distribution:** Loads are distributed over a large contact area between the rollers and raceways, reducing stress and extending bearing life.
- **Operating Temperature:** The bearing is designed to operate within a temperature range of -30°C to +120°C. Continuous operation outside this range can lead to reduced performance or premature failure.
- **Speed Limitations:** Adhere to the maximum permissible operating speeds for the bearing, which are dependent on lubrication, load, and operating temperature. Exceeding these speeds can cause excessive heat generation and damage.
- **Lubrication:** Proper lubrication is essential for reducing friction, dissipating heat, and preventing wear. The recommended lubricant is grease.

MAINTENANCE

Regular maintenance ensures the longevity and reliable operation of your SKF 33220 tapered roller bearing.

Lubrication

- **Regreasing Intervals:** The frequency of regreasing depends on the operating conditions (speed, temperature, load, environment). Consult SKF lubrication guidelines or a qualified engineer for specific recommendations.
- **Lubricant Type:** Always use a high-quality grease compatible with tapered roller bearings and the operating environment. Refer to the specifications for compatible lubricant type.
- **Application:** Apply grease through designated lubrication points, ensuring it reaches the rolling elements and raceways. Avoid over-greasing, which can lead to excessive heat generation.

Inspection

- **Visual Checks:** Periodically inspect the bearing and its immediate surroundings for signs of wear, corrosion, discoloration (indicating overheating), or lubricant leakage.
- **Noise and Vibration:** Monitor for unusual noises or vibrations during operation, which can indicate bearing damage or improper functioning.
- **Temperature Monitoring:** Use temperature sensors or infrared thermometers to monitor bearing temperature. Sudden increases in temperature can signal a problem.

Cleaning

If the bearing needs to be cleaned (e.g., during overhaul), use appropriate cleaning solvents and ensure all residue is removed before relubrication and reassembly. Avoid harsh chemicals that could damage the cage or seals (if present).

TROUBLESHOOTING

This section provides guidance on common issues that may arise with tapered roller bearings and potential solutions.

Symptom	Possible Cause	Action
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Symptom	Possible Cause	Action
Excessive Noise	◦ Insufficient or incorrect lubrication ◦ Contamination (dirt, debris) ◦ Improper installation (misalignment, excessive preload) ◦ Bearing damage (pitting, spalling)	◦ Check lubrication, regrease or replace lubricant ◦ Inspect for contamination, clean or replace bearing ◦ Re-evaluate installation, adjust alignment/preload ◦ Replace damaged bearing
Overheating	◦ Excessive or insufficient lubrication ◦ Excessive preload ◦ Operating speed too high ◦ Misalignment	◦ Adjust lubrication quantity ◦ Reduce preload ◦ Reduce operating speed if possible ◦ Check and correct alignment
Premature Failure	◦ Improper installation ◦ Inadequate lubrication ◦ Overloading ◦ Contamination ◦ Material defects	◦ Review and correct installation procedures ◦ Establish proper lubrication schedule and type ◦ Verify load calculations against bearing capacity ◦ Improve sealing and cleanliness ◦ Contact SKF support if suspected material defect

WARRANTY AND SUPPORT

Specific warranty terms and conditions for the SKF 33220 Tapered Roller Bearing are not provided within this manual. For detailed warranty information, technical support, or service inquiries, please contact SKF directly or refer to the official SKF website.

It is recommended to retain your purchase receipt for any warranty claims.

For further assistance, please visit the official SKF website or contact their customer service department.

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