Deep Groove Ball Bearings

Configuration, fit, sealing and procurement guide

A practical guide to choosing the right configuration before comparing model numbers.

What this guide helps you do

Deep groove ball bearings are widely used for radial loads and can also accommodate axial load within the limits of their design, internal clearance and operating conditions. Their simplicity makes them versatile, but the correct selection still depends on speed, load, fit, temperature, sealing, lubrication and the required service environment.

At a glance

Question	Why it matters
What is the application?	Defines load direction, duty cycle, environment and required life.
What is the complete arrangement?	Bearing, shaft, housing, seals, lubricant and mounting structure work together.
What must be confirmed before ordering?	Full designation, dimensions, load/speed conditions and approved technical data.

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Prepared for engineering review and RFQ preparation. It is not a released product drawing, guaranteed rating, certificate or substitute for the selected manufacturer's catalogue.

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1. Understand the bearing arrangement

Start by defining the function the bearing must perform. Similar-looking bearings can differ in load direction, stiffness, speed capability, mounting requirements and maintenance needs.

Application fit

- **Best starting point:** Confirm bore, outside diameter and width, then verify load, speed, precision, clearance and mounting conditions.
- **Common arrangements:** Open bearings, shielded versions and contact-sealed versions are not equivalent in friction, contamination protection or lubrication needs.
- **Single row vs. double row:** The internal arrangement changes load capability, width and operating behaviour. Do not infer interchangeability from similar outside dimensions.

Design variants to compare

Configuration / feature	Selection notes
Open	Useful where the housing or system provides controlled lubrication and contamination protection. Requires a suitable external sealing arrangement.
Shields (often Z/2Z)	Typically provide non-contact or low-contact protection depending on design; confirm the exact manufacturer suffix and construction.
Seals (often RS/2RS or equivalent)	Usually provide stronger contaminant retention than shields, but may introduce more friction and affect speed/temperature limits.
Internal clearance	C2, CN/normal, C3 and other classes must be selected against fits, temperature and operating conditions; suffix definitions can vary by manufacturer.
Cage and material options	Cage design/material and ring/rolling-element material affect permissible operating conditions. Confirm the exact specification.

Do not compare price or nominal size until the configuration, suffixes and interface dimensions are aligned. If a part is replacing an existing bearing, use the complete designation and drawing rather than appearance alone.

2. Selection inputs and interface checks

The table below is a working checklist. Record known values and mark unknown values for confirmation before quotation or engineering approval.

Input	What to provide / verify
Boundary dimensions	Bore d, outside diameter D, width B, chamfers and shoulder dimensions.
Load and life	Radial/axial load, load direction, equivalent load, required life and reliability assumptions.
Speed and heat	Continuous and peak speed, lubrication method, seal friction, ambient temperature and heat dissipation.
Fit and clearance	Shaft/housing tolerances, interference fit, thermal expansion, internal clearance and possible preload.
Contamination	Dust, water, washdown, particles, sealing arrangement and external seals.
Lubrication	Grease or oil, viscosity, relubrication access, lubricant compatibility and expected service interval.

Questions to resolve before approval

- Are loads steady, intermittent, reversing or shock-loaded?
- Is the stated speed continuous, peak, or a short-duration value?
- Are shaft and housing fits, shoulders and support stiffness known?
- Will temperature, lubricant or sealing requirements change during operation?
- Is interchangeability required, and what drawing or source confirms it?

When data are missing, state the assumption explicitly. Do not turn an unknown load, speed, clearance or preload into an invented numerical value.

3. Installation, lubrication and maintenance

Many early bearing failures are associated with contamination, poor fits, misalignment, inappropriate lubrication or installation damage. Follow the selected product's installation instructions and document the final setting where relevant.

Installation checklist

- Keep bearings sealed in their original packaging until the work area and components are ready. Dirt introduced during assembly can shorten life quickly.
- Use clean, suitable tools and apply mounting force only through the ring being fitted. Never transmit installation force through the rolling elements.
- Verify shaft and housing dimensions, roundness, shoulder squareness and surface finish against the application drawing.
- Do not heat sealed or greased bearings beyond the supplier's permitted temperature. Use controlled heating equipment and follow the product instructions.
- After assembly, check rotation, noise, temperature and seal position. Investigate abnormal heat before returning the equipment to service.

Symptom-to-check guide

Observed symptom	First checks
Overheating	Check excessive interference, insufficient clearance, over-lubrication, seal friction, misalignment and load beyond the design.
Noise	Check contamination, raceway damage, poor fits, vibration from adjacent components and lubricant condition.
Early fatigue	Review load spectrum, shaft/housing alignment, contamination, lubrication and whether the life calculation used realistic conditions.
Seal damage or grease loss	Check installation handling, shaft surface, seal lip compatibility, temperature and chemical exposure.
Creep or ring movement	Check fit, load direction, vibration, mounting tolerances and whether the ring is adequately supported.

Record the operating condition when a symptom appears: load, speed, temperature, noise/vibration, lubrication state, recent maintenance and any change to the surrounding structure. This information helps separate a bearing issue from an installation or system issue.

4. RFQ checklist — send the right information

A complete RFQ reduces clarification cycles and helps the supplier check whether the requested bearing and arrangement match the application. Provide drawings or photos where dimensions and interfaces are difficult to describe.

- Full designation and suffix, or clear photos of all markings.
- Required dimensions: d × D × B, chamfers and any special shoulder/interface dimensions.
- Load, speed, duty cycle, target life and operating temperature.
- Open, shielded or sealed requirement; internal clearance and precision class if specified.
- Shaft/housing material, fit tolerances, alignment and mounting arrangement.
- Grease/oil requirements, contamination exposure and maintenance interval.
- Quantity, packaging, inspection documentation and delivery destination.

Suggested RFQ email structure

Field	Your information
Product / full designation	_____
Quantity and annual demand	_____
Application / equipment	_____
Loads, speed and duty cycle	_____
Dimensions / drawing number	_____
Operating environment / lubricant	_____
Quality documents / inspection	_____
Delivery destination / target date	_____

Need help confirming a designation or a substitution? Send the full model number, drawing, quantity and operating conditions to service@eimbearing.com or visit www.eimbearing.com.

5. Technical boundaries and final verification

This document provides general selection and procurement guidance. It does not provide product-specific rated loads, fatigue-life guarantees, maximum speeds, permissible misalignment, preload values, fit tolerances or installation torque unless those values are stated in an approved drawing or product-specific data sheet.

Before release to production

- Confirm the full bearing designation, suffixes and dimensional drawing.
- Confirm the source and revision of any load, speed, life or precision rating used in calculations.
- Verify the bearing, shaft, housing, seals, lubricant and mounting fasteners as a complete system.
- Record any deviations, substitutions and approval responsibilities.
- Follow the supplier's current installation, lubrication and maintenance instructions.

Important note

Catalogue values and suffix meanings may vary by manufacturer and product family. Where a guide describes a general bearing arrangement, it should not be interpreted as proof that two products are interchangeable. Confirm final technical suitability with the applicable product drawing and written supplier confirmation.

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